DOCUMENT RESUME

ED 452 683 EF 005 908

AUTHOR	Green, Thomas A., Ed.
TITLE	IPM Standards for Schools: A Program for Reducing Pest and Pesticide Risks in Schools and Other Sensitive Environments. Version 2.0.
INSTITUTION	IPM Inst. of North America, Inc., Madison, WI.
SPONS AGENCY	Cooperative State Research, Education, and Extension Service (USDA), Washington, DC.
PUB DATE	2000-11-20
NOTE	129p.; Also funded by the IPM Program of the U.S. Department of Agriculture.
AVAILABLE FROM	IPM Institute of North America, Inc., 1914 Rowley Ave., Madison, WI 53705. Tel: 608-232-1528; Fax: 608-232-1530; e-mail: ipminstitute@cs.org. For full text: http://www.ipminstitute.org.
PUB TYPE	Legal/Legislative/Regulatory Materials (090) -- Tests/Questionnaires (160)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	*Certification; Elementary Secondary Education; Guidelines; *Pests; *Public Schools; *Risk Management; *Standards
IDENTIFIERS	*Integrated Pest Management; Wisconsin

ABSTRACT

This guide presents Integrated Pest Management (IPM) practice standards for educational facilities to help schools become certified in providing effective and safe pest control. The guide is divided into two parts with three modules each for both buildings and grounds. The first module addresses building the IPM foundation to meet all legal requirements, identify necessary resources, create an IPM policy, set up documentation, establish community communications, and end routine pesticide applications. The second module guides schools in establishing roles and training key players; identifying priorities and creating a pest management plan; and limiting pest control actions to effective, reduced-risk options. The third module addresses issues of administration, policy, and pest control practices for certification. Not all practices are needed for certification, so an IPM scoring system is included for both buildings and grounds to be used to verify certification. Appendices contain a list of reduced- risk and least-risk pest control definitions, a glossary, and additional resources for implementing IPM in schools. (GR)

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IPM Standards for Schools

A Program for Reducing Pest and Pesticide Risks

in Schools and Other Sensitive Environments

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Version 2.0
Released November 20, 2000

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About Version 2.0

Version 2.0 is also available in html and PDF format from the IPM Institute's Web site. Version 2.0 includes additions to the appendices including model legislation, school pest management practice surveys, IPM curricula and workshop ideas, directory of organizations with school IPM resources and school pest management headlines from U.S. newspapers. This version also includes revised pest control options definitions (Appendix A) and other minor revisions throughout. Your comments and suggestions are welcome.

About the IPM Institute

The IPM Institute of North America, Inc. is a non-profit membership organization formed in 1998. The Institute's mission is to accelerate adoption of IPM in agriculture and communities through consumer education and development of IPM standards for self-evaluation and IPM certification. The Institute's Board of Directors includes IPM experts from Land-Grant Universities and representatives from industry and environmental organizations. To join the Institute, please visit our Web site at http://www.ipminstitute.org or contact us at the address below.

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Acknowledgements

These IPM Standards would not have been possible without the generous contribution of time and thought from many individuals, including the following:

Trevor Battle and Mark Buffone, Massachusetts Department of Agriculture; Lynn Braband, Jody Gangloff and Curtis Petzoldt, Cooperative Extension, Cornell University; Kristine Braman, Cooperative Extension, University of Georgia; Paul Burns, Massachusetts Public Interest Research Group, Boston MA; John Carter, Monroe County Community Schools Corp., Bloomington IN; Alan Cohen, Bio-Logical Pest Management Inc., Washington DC; William Coli, Reg Coler and Craig Hollingsworth, UMass Extension; Robert Corrigan, RMC Consulting, Richmond IN; Edward Crow, Maryland Department of Agriculture; Dan Dickerson, Director, Pest Control, NYC Board of Education; Philip Dickey, Washington Toxics Coalition, Seattle WA; Doug Dickson and Dan Bach, Newton IPM Advisory Committee, Newton MA; Carrie Foss and Arthur Antonelli, Cooperative Extension, Washington State University; Lynn Garling, Cooperative Extension, Penn State University; Ellie Goldberg, Healthy Kids, Newton MA; Daniel LaHart and Denise Frye, Anne Arundel County Public Schools, Pasadena MD; Marc Lame, Indiana University; Will Lanier, Cooperative Extension, Montana State University; Michael Merchant, Cooperative Extension, Texas A&M University; Kathy Murray, Maine Department of Agriculture, Food & Rural Resources; Jane Nogaki, NJ Environmental Federation; Kagan Owens, National Coalition Against Misuse of Pesticides, Washington DC; Michael Pierce, Robert DeLuca and Michael Davis, Newton Public Schools, Newtonville MA; Don Prostak, American IPM, Glen Gardner NJ; Debbie Raphael, IPM Coordinator, City/County of San Francisco; Don Rivard, Rivard's Resources – IPM, Waltham MA; Robyn Rose and Kathy Seikel, US EPA Office of Pesticide Programs; Cliff Sadof, Cooperative Extension, Purdue University; Clay Scherer, Cooperative Extension, University of Florida; Paula Shrewsbury and Betty Marose, Cooperative Extension, University of Maryland; Deborah Smith-Fiola, Cooperative Extension, Rutgers University; John Stier, Cooperative Extension, University of Wisconsin; Michael Waldvogel, Cooperative Extension, North Carolina State University; and Megan Terebus.

Technical information was drawn from the experience of contributors and publications listed in Appendix C and especially from Daar *et al.* (1997), Driestadt *et al.* (1994), Hollingsworth (2000), Mallis (1997) and Vail and Croker (1999). Any errors or omissions are those of the editor. Information contained in this document does not necessarily represent the views and opinions of the contributors or their organizations, and no endorsement is implied.

The following IPM assessment systems for agriculture provided models for these Standards:

Guillebeau, P. and G. Van De Mark, 1999. Georgia Farm*A*Syst/Cotton*A*Syst Cotton IPM: Farm Assessment System. University of Georgia Cooperative Extension Service, Athens GA.

Hollingsworth, C. S. and W. M. Coli, eds., 1999. Massachusetts Integrated Pest Management Guidelines: Crop Specific Definitions. University of Massachusetts Extension Integrated Pest Management Program, Amherst MA. Available at http://www.umass.edu/umext/programs/agro/ipm/ipm_guidelines/

National Potato Council, 1998. The National IPM Protocol for Potatoes: A Pest Management Assessment Tool and Educational Program Developed for America's Potato Growers. Englewood, CO. More at http://:www.npcspud.com

Petzoldt, C., J. Kovach and A. Seaman, eds., 1999. Integrated Pest Management Standards for New York Crops. New York State Integrated Pest Management Program No. 124. 64 pp. Available at http://www.nysaes.cornell.edu/ipmnet/indyintro.html

Funding has been provided by the IPM Program of the United States Department of Agriculture, Cooperative State Research, Education and Extension Service (USDA-CSREES), and members and supporters of the IPM Institute.

Dedicated to Ronald J. Prokopy who is responsible for my IPM foundation. – *The Editor*

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Introduction

Integrated Pest Management (IPM) maintains a high standard of pest control while reducing reliance on pesticides. IPM includes:

- regular monitoring to detect problems early;
- acting against pests only when necessary;
- choosing the most effective option with the least risk to people and the environment; and
- applying biological knowledge about pests to create long-term solutions.

Routine pesticide applications, made on a regular calendar-based schedule, are not part of IPM. Allowing pests to flourish, increasing health risks to building occupants and others, is also not part of IPM.

Why IPM in Schools?

By improving pest control, reducing reliance on pesticides and incorporating least-risk control options, IPM reduces both pest and pesticide risks. Using IPM in the school environment is especially important. Children spend a great deal of time in schools and face greater potential for health effects resulting from pest and pesticide exposure. By reducing risks, IPM can also reduce potential liability to school systems from accidental poisoning, allergies or other harmful effects of pests and pesticides on children and adults.

Depending on your school system's current practices, IPM has potential to save time and money. By taking actions to avoid pest problems and applying pesticides only when necessary, many schools will reduce costs over the long term, while achieving excellent pest control.

Finally, IPM has a critical role to play in agriculture, our homes and throughout our communities. Schools adopting IPM set an important example and can be instrumental in teaching staff, students and parents about the practice and benefits of IPM.

Children Face Greater Risks from Pests and Pesticides

"Pound for pound of body weight, children not only breathe more, eat more, and have a more rapid metabolism than adults, but they also play on the floor and lawn where pesticides are commonly applied. Children have more frequent hand-to-mouth contact as well. Children generally are more susceptible than adults to environmental toxics because they are growing and developing. Also, their enzymatic, metabolic and immune systems are immature, allowing in some cases for less natural protection than that of adults."

- Office of Children's Health Protection, US EPA, http://www.epa.gov/children/

"...pests are more than a nuisance. They can pose a serious health threat to young children who are unaware of the danger. Consider these statistics:

- *Rats bite more than 45,000 people annually, mostly infants and children.*
- *Seven to 8 percent of the U.S. population is allergic to cockroaches. Studies of inner-city children in Atlanta with chronic wheezing, runny eyes and noses revealed that 44 percent were allergic to cockroaches.*
- *Rodents are responsible for, or implicated in, the spread of numerous diseases, including hantavirus, plague, acute food poisoning, rat-bite fever and typhus.*
- *Lyme disease, transmitted to humans by the deer tick, infects thousands of Americans annually — and the numbers are rising.*
- *Cockroaches transmit a variety of digestive tract disorders, including food poisoning, dysentery and diarrhea.*
- *Mosquitoes are prime carriers of several types of encephalitis, a devastating illness that attacks the central nervous system of humans."*

- Excerpt from "Why Children are Especially at Risk," Responsible Industry for a Sound Environment, http://www.acpa.org/rise/n-step-ris.html

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IPM Standards for Schools

How do you know if the pest management practices in your school are the least risk, most effective available? Are you doing as much as possible to prevent and avoid pest problems? How many of the available IPM practices is your school implementing? IPM Standards serve as checklists of IPM practices for school buildings and grounds. Use them to help you answer these questions.

In agriculture, the use of IPM checklists is increasing. Farmers using IPM checklists are implementing a greater number of IPM practices than non-participants. IPM Standards for schools have the same potential for increasing both the number of schools implementing IPM and the level of IPM practiced.

These IPM Standards for schools are designed to function as a:

1. **Learning Tool.** Review the IPM Standards to learn about the many options available to you. Follow up by reviewing the references listed and discussing practices appropriate for your school with your IPM committee, professional pest control provider, in-house professional pest control staff, administration and interested parents and teachers.
2. **Self-Evaluation and IPM Planning Tool.** Use the Standards to score your school. What additional IPM practices can you implement to improve your performance over the next year? The next three years? Use the practices you have identified as priorities to justify pest control budget requests.
3. **School IPM Certification Tool.** By meeting certain minimum requirements, your school can become certified as an IPM School by the IPM Institute.

IPM Certification for Schools

By implementing IPM, your school can improve pest management results and reduce liability and risks from both pests and pesticides. Certification clearly establishes your school's IPM achievement in a way that is readily recognized by others both in and outside of your community.

By working towards and achieving IPM Certification, your school will:

- establish a formal schedule for IPM evaluation, planning and training including site visits and comprehensive program review by a qualified outside IPM professional every three years;
- receive regular feedback on your IPM program from a school IPM professional;
- build a professional image and create goodwill with staff, parents and other community members;
- create an ongoing focus on pest and pesticide risk reduction, ensuring that your school continues to meet the highest standards for effective, reduced-risk pest management; and
- access a package of professionally prepared materials, including a brochure, certificate and window stickers to communicate your accomplishment.

Your school can use these materials to inform parents, teachers, students and others in the community about your IPM program. These prepared materials can save time for busy school professionals, reduce costs and duplication of effort, and facilitate clear and accurate transfer of information.

Certification may also exempt schools from certain legislative mandates or administrative requirements as a clear demonstration that your school has an effective, state-of-the-art IPM program in place.

Implementing IPM can involve startup costs for training and pest preventative measures to improve sanitation or exclude pests. Although these measures can reduce costs over the long term, these expenses may exceed a school's available budget for pest control in the first years. The IPM Institute is

working to recruit community members interested in promoting IPM to provide funding for these IPM startup costs. See the IPM Institute's Web site at http://www.ipminstitute.org for more information.

Any school may use these IPM Standards to assist in developing and maintaining an IPM program. Certification is a voluntary step for schools or school systems.

Becoming an IPM Certified School

To become fully certified by the IPM Institute, your school or school system must:

1. Implement MODULES ONE and TWO and all practices in MODULE THREE labeled "Priority." (i.e., earn at least 80% of the points available for each practice).
2. Implement sufficient additional IPM practices to earn at least a 70% overall score on all Sections applicable to your school.
3. Use only pest controls meeting the definitions for Reduced-Risk or Least-Risk (Appendix A).
4. Contact a Certified IPM Verifier for inspection.
5. Complete an application and pay the appropriate membership fee.

To maintain certified status, your school must complete a re-inspection every three years. A list of Certified IPM Verifiers and application is available from the IPM Institute Web site, http://www.ipminstitute.org. Certified IPM Verifiers can assist you with questions you have about IPM implementation and the certification process.

Other Sensitive Environments

Many of the IPM practices listed in the *IPM Standards for Schools* can also be implemented in other sensitive environments, including day cares, nurseries, pre-schools, hospitals and nursing homes.

Many of the resources listed throughout are also useful for professionals working in these other environments. We welcome your comments on the need for Standards for these other environments, and are willing to work with you to adapt the *IPM Standards for Schools* for your industry.

Join the IPM Institute!

Any individual or organization can support the work of the IPM Institute by becoming a member. Members enjoy a periodic newsletter with information about IPM, certified institutions and businesses, and the knowledge that they are supporting the growth and development of IPM certification programs in schools, communities and agriculture. Join by signing on to our Web site, or by mail, phone, fax or e-mail (see contact information below).

School IPM Success Stories

The New York City Board of Education, representing approximately 1200 school buildings, has eliminated indoor dust formulations of every kind to reduce airborne particulates; eliminated all "pelleted" rodenticides to reduce risk of movement; eliminated outside rodenticide bait stations, opting to bait and close existing burrows; increased reliance on glue board monitoring as both indicators and supplementary controls; and reduced the use of one class of pesticides from 918 to 22 lbs. per year. Since 1988, the school system has used over 8000 tubes of sealing silicone glue to close potential pest entries. More at http://www.epa.gov/oppbppd1/PESP/p&s_pages/nycbe.htm

A demonstration project at two public schools in Santa Barbara County, CA reduced costs by 30% and improved effectiveness of the pest control program. More at http://www.grc.org/cec/pubs/IPM_report2.html

The Monroe County School Corporation, Monroe County, IN, implemented a pilot IPM program that eliminated 90% of pesticide applications in three elementary schools. More at http://www.epa.gov/oppbppd1/PESP/p&s_pages/mcsc.htm

Your school can become an IPM success story too!

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Resources for Starting an IPM Program at your School

These IPM Standards are intended as a guide to IPM practices available to schools. To implement these practices, you will need resources such as professional Pest Managers with a successful track record implementing IPM, Cooperative Extension personnel and information, environmental and public interest organizations active in school pest management and a broad selection of print or Web-based resources, including those listed throughout these IPM Standards for Schools.

Resources developed by Extension and others in your state and region are especially important, as these will include information specific to your region (e.g., laws, regulations, region-specific pest issues). Finally, the IPM Institute has developed a list of Certified IPM Verifiers and Managers. Many of these professionals have experience working with schools initiating and maintaining IPM programs, and can offer advice on how to implement IPM in your school as well as assist with the certification process.

Join the School IPM E-Mail List

Post your questions to a forum of school IPM professionals from around the country. Read questions and responses from school administrators, Extension specialists, pest management professionals and others working to reduce pest and pesticide risks in schools.

This list is open for membership to any person interested in IPM in schools and wishes to discuss this subject with others on the list.

To subscribe to this mailing list, send an e-mail to listserv@lists.ufl.edu. Leave the subject line blank and in the text of the message type the following:

subscribe Schoolbugs-L *Your Name*

Replace *Your Name* with your own name. When you subscribe, you will be e-mailed a list of instructions on how to use the list, unsubscribe, etc. For more information, visit the Web site at http://gnv.ifas.ufl.edu/~schoolipm/listsrvr.htm

Resources for Starting Your IPM Program:

Boise, P., and K. Feeney, 1999. Reducing Pesticides in Schools: How Two Elementary Schools Control Common Pests Using Integrated Pest Management Strategies. S. Wright, ed. Community Environmental Council, Santa Barbara CA. Available at http://www.grc.org/cec/pubs/IPM_report2.html

Daar *et al.*, 1997. Appendix B. How to develop an IPM program. Pp. 159-167. *In* IPM for Schools: A How-to Manual. Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Koehler, *et al.*, 1999. School IPM Web Site. University of Florida. *The national Web site for IPM in schools, including how to get started; basic education and advanced technical information about school IPM; downloadable presentations in html, Acrobat and Powerpoint formats; and links to web sites for state-specific resources, IPM teaching curricula, general IPM, pest control and identification, pesticides and health, State Departments of Education and Health, national and state pest control associations, and fun WWW sites related to school IPM.* Available at http://www.ifas.ufl.edu/~schoolipm/

Merchant and Merchant, 1997. The ABC's of IPM Video Series: Module 1. An Introduction; Module 2. Structural Pest Control; Module 3. Food Handling Areas; Module 4. Bids and Contracts; Module 5. The Administrative Challenge. Available from Distribution and Supply Office, Texas Agricultural Extension Service, P.O. Box 1209, Bryan TX 77806-1209, (979) 845-6571, (FAX 979) 862-1566.

Stier *et al.*, 1999. Section 1: Essential elements of IPM. *In* Wisconsin's School Integrated Pest Management Manual. Available at http://ipcm.wisc.edu/programs/school/default.htm

U. S. Environmental Protection Agency. Integrated Pest Management in Schools Nationwide Directory. *Links to state and regional school IPM Web sites; state list of government, University and Extension contacts for school IPM.* Available at http://www.epa.gov/reg5foia/pest/matilla/ipm_dir.html

Completing the IPM Standards for Schools

IPM Standards are included in two parts, one for school buildings and one for school grounds. If your school grounds are managed by a separate department, such as a city or county parks office, please refer the school grounds part to the appropriate personnel. Schools may become IPM certified for their school buildings, school grounds, or both, and on an individual school or system-wide basis.

To help you set priorities for implementing IPM practices, both Buildings and Grounds sections are organized into three Modules:

MODULE ONE: *Building the IPM Foundation*

By completing MODULE ONE, you will be putting your IPM program on a firm foundation:

- meeting all legal requirements;
- identifying resources necessary for an effective IPM program;
- creating an IPM policy, committee and coordinator to guide decision-making;
- setting up basic record keeping;
- establishing community right-to-know; and
- ending routine pesticide applications.

These essential IPM practices are recommended for all school IPM programs and represent an excellent starting point for new programs. Each MODULE ONE practice should be substantially completed before moving on. For certification purposes, each MODULE ONE practice must be substantially completed (score 80% or more of the points available for each practice).

MODULE TWO: *Raising the IPM Framework*

MODULE TWO practices build on the foundation by:

- establishing roles and training for key players;
- identifying priorities and creating a pest management plan; and
- limiting pest control actions to effective, reduced-risk options.

Some MODULE TWO practices may not apply to your school; scoring these as Not Applicable "N/A" will not affect your total score. For certification purposes, each MODULE TWO practice must be substantially completed (score 80% or more of the points available for each practice).

MODULE THREE: *Achieving IPM Excellence!*

MODULE THREE practices put your IPM program on the map, systematically addressing administrative and policy as well as pest-specific issues. Implementing these practices will help you manage pests effectively with a minimum of risk. NOTE: In MODULE THREE, you do not need to complete each pest-specific section, just those for the pests you experience problems with at your school. Most schools will need to complete just a few of these sections.

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To become an IPM Certified School or School System, you must score a total of 70% of all applicable points in MODULE THREE, use only Reduced-Risk or Least-Risk pest controls, and have your performance evaluated by a Certified IPM Verifier. Unlike MODULES ONE and TWO, all practices in MODULE THREE do not have to be implemented for certification. Simply earn enough points on those practices you choose to implement to earn an overall 70% score. Schedule appropriate practices above and beyond those required for certification for continued improvement of your IPM Program.

Calculating Your IPM Score

The Standards include administrative, policy and pest-specific IPM practices. Each practice is assigned a point value. By implementing a listed practice, you earn the points assigned to the practice.

Priority Practices are clearly marked. Priority Practices are required for certification, in addition to all MODULE ONE and TWO practices. Score 80% or more of the points available for each Priority Practice, just as you must for each practice in MODULES ONE and TWO.

Bonus Practices are also clearly marked. Points for these practices are not included in the total points available in each section, but if earned, should be added to your score.

Partial Credit can be applied to practices that are only partially implemented, or implemented on only a portion of possible sites, occasions, etc. For example, if door sweeps are placed on most but not all doors, partial credit is permitted based on the proportion of doors with sweeps. Obviously, any door without a sweep is a potential pest entry and should be scheduled for correction.

Use partial credit to signal practices that have been implemented but can be improved and make a note of the improvement needed. For certification purposes, the verifier will determine how many points to apply, and may decline to give any credit for partial completion of a practice that is adversely affecting pest or pesticide risk management in a significant way.

Reduced-Risk and Least-Risk Pest Control Options are referred to throughout the Standards. These options are defined in Appendix A. Certified schools may use only materials meeting these definitions. A growing list of these options, including products and trade names, is available at the IPM Institute Web site at http://www.ipminstitute.org

Pests or Practices Not Applicable (N/A). Some sections of the Standards refer to pests that may not be a problem at your school, or may include practices that are not applicable. Mark these sections or practices as N/A (not applicable) and move on. The Scorecard provides a column to note the points available for these sections and instructs you how to adjust your score for non-applicable sections and practices.

IPM Scorecards. By working through the Standards, you accumulate points toward your total score. Use the two IPM Scorecards (one for school buildings and one for school grounds) to calculate your overall score and convert your score to a percentage.

Glossary. Unfamiliar terms are defined in Appendix B. When these terms first appear in the text, they appear in *italics*.

For IPM Certification by the IPM Institute, your school must earn a minimum of 70% and have your passing score confirmed by an IPM Verifier approved by the IPM Institute. The Verifier will visit your school, review your written materials (IPM Plan, pesticide application records, pest log book, etc.) and interview your IPM Coordinator and Pest Manager.

An application for certification is available at http://www.ipminstitute.org, or by contacting the IPM Institute at (608) 232-1528, FAX (608) 232-1530, E-mail ipminstitute@cs.com

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Part I. IPM Standards for School Buildings

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MODULE ONE: IPM FOUNDATION for School Buildings

Section 1. IPM Planning and Communication

	Points Available	Points Earned
1. Appropriate personnel (e.g., superintendent, facilities manager, principal, *IPM Coordinator*) understand and ensure that the school meets all Federal, State and local legal requirements related to *pest* management in schools (e.g., posting, notification, pesticide management, etc.). ***Legal requirements that exceed or conflict with practices in these Standards supercede those listed here.***	20	
2. Resources are identified and acquired to assist in developing and implementing IPM (e.g., state/county Extension personnel, publications and on-line resources; non-governmental organizations, pest management professionals with expertise in school IPM).	20	
3. A written *IPM policy* is adopted which		
a. states a commitment to IPM implementation;	5	
b. identifies overall objectives relating to pest and pesticide risk management;	5	
c. is used to guide decision-making; and	5	
d. is reviewed at least once every three years and revised as needed.	5	
4. An *IPM Committee* is formed to create and maintain the IPM policy, provide guidance in interpreting the policy, and provide oversight of the program.	20	
5. An *IPM Coordinator* is designated to provide day-to-day oversight of IPM implementation.	20	
6. A plan is developed and implemented to provide necessary IPM training for the IPM Coordinator.	20	
7. *Pest Manager* is aware of and has access to resources to identify key pests.	20	
8. A pesticide notification policy is implemented such that:		
a. At least 24 hours prior to pesticide application, postings are placed in a designated public area detailing locations to be treated and contact information for further information *(exceptions may be made for applications made for emergencies, where an imminent threat to health exists (e.g., stinging insects), or for applications of* anti-microbials *and for pesticides defined as Least-Risk (Appendix A); for emergency applications, postings must be placed as soon as practical);*	10	
b. this notice remains posted for at least 48 hours post-application; and	10	

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c. copies of the pesticide label and MSDS sheet for the material(s) to be used are available on request and maintained on file in a central location (e.g., main office).	10	_____
9. Complete, legible records of each pesticide application, including product, quantity used, date and time of application, location, application method and target pests are maintained for at least three years.	20	_____
10. Public access is provided on request to all information about the IPM policy, IPM plan and implementation.	20	_____

Section 2. Inspection, Sanitation and Exclusion

1. At least a preliminary review of school buildings is conducted to determine nature and extent of pest problems and contributing factors. This information is used to set IPM priorities.	20	_____

Section 3. Pest and Pesticide Risk Management

1. All pesticide applications are made by a person certified and/or licensed by the state to apply pesticides in commercial facilities.	20	_____
2. All pesticide applications are made only after detection of a verifiable pest problem and accurate identification of the pest. Applications are not made on a routine or regularly scheduled basis (e.g., weekly, monthly applications are not made).	20	_____
3. At least a preliminary review of pesticide use practices in school buildings is conducted to evaluate pesticide risks. This information is used to set priorities for reducing or replacing high-risk pesticides and use practices.	20	_____
Total MODULE ONE IPM Points Available	**290**	
Total MODULE ONE Points Earned		_____

About MODULE ONE and MODULE TWO IPM Practices

MODULE ONE and TWO practices are recommended for all school IPM programs, and represent an excellent starting point for new programs. These practices should be substantially completed before moving on. For certification, each MODULE ONE and TWO practice must be substantially completed (earn 80% or more of the points available for each practice). As you work through the Standards, be sure to note which practices need improvement.

For information on how to implement IPM practices, including model IPM policies, see the list on the pages following MODULE ONE.

For an explanation of unfamiliar terms, see the Glossary in Appendix B.

Completed MODULE ONE or MODULE TWO? See the IPM Institute Web site for an "IPM in Progress" Certificate, recognizing your accomplishment!

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Note items requiring additional action:

Evaluating Your Performance

Perfection is an ideal rarely accomplished in the real world. When evaluating your performance on IPM practices listed in these standards, use a critical eye to identify areas for improvement. Make a note of the action needed, and score the practice accordingly. Remember, continuous improvement in reducing pests and pesticide risks is the goal, not a perfect score.

For certification purposes, Certified IPM Verifiers will also apply this perspective, working with you in a supportive manner to improve the effectiveness and efficiency of your IPM program.

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Resources for IPM Administration and Policy

All resource lists also available at www.ipminstitute.org, including active links!

IPM Planning and Communication

Becker, B., 2000. Qualities to Look for in a Professional Pest Control Operator (PCO). *Guidelines for evaluating pest management professionals, including qualifications, services offered, IPM approach, use of pesticides, recordkeeping.* Available at http://www.ifas.ufl.edu/~schoolipm/admn_con.htm

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Daar *et al.*, 1997. Chapter 3. Setting injury and action thresholds, pp. 15-18; Appendix A. IPM-related curricula and resources for the classroom, pp. 157-158; Appendix B. How to develop an IPM program, pp. 159-167; Appendix C. Developing an IPM policy statement for school pest management, pp. 169-170; Appendix D. Integrated pest management (IPM) contract performance specifications, pp. 171- 175. *In* IPM for Schools: A How-to Manual. *Setting action thresholds; descriptions and contact information for IPM-related games, projects and curriculum guides; pest management roles; model IPM policy statement; model pest control service contract specifications.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Koehler *et al.*, 1999. School IPM Web Site. University of Florida. *Model IPM policy statement, pest control service contract specifications, pest sightings log and intent to apply pesticides notice; links to national and state resources for IPM in schools and IPM-related curricula resources.* Available at http://www.ifas.ufl.edu/~schoolipm/

Legal Environmental Assistance Foundation Inc., 1998. Community Action to Manage Pesticide Use in Schools (Campus): A Georgia Guide. 70 pp. *Summary of pesticide and pest control regulations and policies; model IPM policies; step-by-step guide to establishing an IPM program in schools; model job descriptions for IPM committees and IPM coordinators; model facilities survey form; model IPM service log, pest report log, pesticide application logs.* Available from LEAF, 1114 Thomasville Rd., Suite E, Tallahassee FL 32303-6290, (850) 681-2591, Fax (850) 224-1275. E-mail: leaf@lewisweb.net, Web site: http://www.leaf-envirolaw.org

Maryland Department of Agriculture. Action Thresholds in School IPM Programs. Pesticide Regulation Section, Annapolis, MD. 10 pp. Available at http://gnv.ifas.ufl.edu/~schoolipm/tp.htm

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Minnesota Department of Health, 2000. Model Pesticide Notice. *Model notices to parents and school employees of pesticide applications, conforming to requirements of MN State law.* Available at http://www.health.state.mn.us/divs/eh/esa/hra/notification.html

Northwest Coalition for Alternatives to Pesticides, 1994. *Model IPM policy statement.* Available at http://www.pesticide.org/default.htm

New York State Office of General Services Procurement Services, 1998. OGS Integrated Pest Management RFP and Specifications. 27 pp. *Model pest control service contract specifications.* Available at http://www.ogs.state.ny.us/purchase/snt/awardnotes/71010s940019spec.htm

Pennsylvania State University, 1999. IPM in Schools. *Model IPM policy statement.* Available at http://paipm.cas.psu.edu/schools/schoolIPM.html

Safer Pest Control Project. Model IPM policy statement conforming with IL State Law; "Cost of IPM in Schools, " two-page fact sheet in PDF format includes cost comparisons from school systems; "Guidelines for IPM in School Pest Management Contracts," one-page PDF fact sheet designed to help schools incorporate IPM into existing contracts with pest management professionals; pesticide application notification guidelines and model language. Available at http://www.spcpweb.org/

Stauffer *et al.*, 1998. Chapter 3.0. Administration of an IPM program. Pp. 3-1 to 3-26 In IPM Workbook for New York State Schools. *IPM policy statements, roles, education and training, record keeping, notification, model bid specifications, model rating system for evaluating pest control bids.* Available at http://www.nysaes.cornell.edu/ipmnet/ny/urban/workbook_final.pdf

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Stier *et al.*, 1999. Section 6: Pest Management Plan. *In* Wisconsin's School Integrated Pest Management Manual. *Model IPM policy, IPM plan, model reporting forms.* Available at http://ipcm.wisc.edu/programs/school/default.htm

Texas, State of, 1999. Integrated pest management in schools. Structural Pest Control Board. *Texas law and regulations, model IPM policy statement, model IPM bid specifications, most frequently asked questions regarding IPM, downloadable IPM forms and information.* Available at http://www.spcb.state.tx.us/ipm/ipmindex.htm

US General Services Agency, 1999. Contract Guide Specifications for Integrated Pest Management Programs in Government Buildings and Schools. 7 pp. *Suggested guidelines for use when contracting with a pest management professional for services, including inspection, IPM plan, use of pesticides, recordkeeping.* Available at http://www.ifas.ufl.edu/~schoolipm/admn_con.htm

University of Florida Department of Entomology and Nematology, 2000. Best of the Bugs Web Site. *List of top web sites covering insects, mites and nematodes, including sites with teaching curricula.* http://www.ifas.ufl.edu/~entweb/uf-bob/

West Virginia Dept. of Agriculture, 1999. Integrated Pest Management in Schools and Other Public Institutions: Best Management Practices. *Model IPM policy, setting action thresholds, vendor evaluation criteria and contracts.* Available from the WV Dept. of Agriculture, 1900 Kanawha Boulevard E., Charleston WV 25305-0170.

Inspection, Sanitation and Exclusion

Daar *et al.*, 1997. Appendix E. Sample monitoring forms, pp. 177-194; Appendix F. How to collect and preserve specimens for identification, pp. 195-196; Appendix I. Inspection checklist for detecting structural decay and structural pest damage, pp. 209-213. *In* IPM for Schools: A How-to Manual. *Model monitoring forms for roach traps and landscapes, model pest control trouble call log; collecting pest and plant specimens; locations and features to inspect in and around structures with detailed instructions.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Koehler et al., 1999. School IPM Web Site. University of Florida. Model cafeteria inspection checklist, importance of sanitation. Available at http://gnv.ifas.ufl.edu/~schoolipm/index.html

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Pest and Pesticide Risk Management

Bio-Integral Resource Center, 2000. Directory of Least-Toxic Pest Control Products. The IPM Practitioner 21: (11/12) 1-38. List of least-toxic controls by target pest, including insect, plant disease, weed and vertebrate pests; list of suppliers with contact information. Available from BIRC, PO Box 7414, Berkeley CA 94707. (510) 524-2567, FAX (510) 524-1758, E-mail birc@igc.org

Braness, G., 1997. Chapter 23. Insecticides used in pest control. Pp. 1061-1101. *In* Handbook of Pest Control, A. Mallis, ed. *B&W photos, chemical classifications, mode of actions, formulations and table of insecticides with trade names, common names, US EPA signal word and uses.* Available from GIE Media, (800) 456-0707.

Brown, A. E., 1999. Pesticide Information Leaflet Series. University of Maryland. A series of 29 downloadable leaflets in PDF format including insect repellant safety, pesticide safe use checklist, protecting ground water, pesticides associated with skin diseases, reading pesticide labels, multiple chemical sensitivity, pesticides and cancer, pesticides and the endocrine system. Available at http://www.pest.umd.edu/spatc/Leaflets/LeafletList.html

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Mueller, D. K., 1997. Chapter 24. Fumigation. Pp. 1103-1152. *In* Handbook of Pest Control, A. Mallis, ed. *B&W photos, line drawings, mode of action, safety, heat treatment.* Available from GIE Media, (800) 456-0707.

National Pesticide Telecommunications Network. *Toll-free telephone service provides pesticide information, fact sheets on pesticides and anti-microbials.* (800) 858-7378. More at http://ace.orst.edu/info/nptn/index.html

Northwest Coalition for Alternatives to Pesticides, 1999. School Pesticide Use Reduction Program. *Fact sheets on pesticides and alternatives to pesticides, Journal of Pesticide Reform quarterly newsletter.* Available at http://www.pesticide.org/default.htm

Pesticide Action Network, 2000. PAN Pesticide Database. *Comprehensive online database on the health hazards of more than 5,100 ingredients in pesticides including whether a pesticide is a carcinogen, a reproductive or developmental toxicant or causes other harm to health and which chemicals pollute ground water or kill aquatic wildlife. Sources include the World Health Organization, National Institutes of Health, National Toxicology Program, U.S. Environmental Protection Agency and independent published and peer-reviewed research.* Available at http://www.pesticideinfo.org

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Tucker, J.B., 1997. Chapter 29. Sensitive environments. Pp. 1325-1366. In Handbook of Pest Control, A. Mallis, ed. *Pest management principles and strategies for sensitive environments including schools.* Available from GIE Media, (800) 456-0707.

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MODULE TWO: IPM FRAMEWORK for School Buildings

Section 1. IPM Planning and Communication

	Points Available	Points Earned
1. Pest management roles are developed for and communicated at least annually to:		
a) administrators (e.g., principals regarding posting, notification, reporting, etc.);	5	_____
b) teachers (e.g., do not bring in/apply pesticides, sanitation, etc.);	5	_____
c) custodians (e.g., pest sightings log, inspection, sanitation, exclusion, etc.);	5	_____
d) food handlers (e.g., sanitation, exclusion, etc.); and	5	_____
e) outside contractors (e.g., IPM policy, posting, pest control options to outside pest management professionals).	5	_____
2. Pest management roles are developed for and communicated at least on an as needed basis (e.g., headlice incident):		
a) students (e.g., reporting, sanitation, head lice prevention, etc.); and	5	_____
b) parents (e.g., no nit policy)	5	_____
3. A written IPM Plan is prepared that includes a schedule for inspection and monitoring of buildings and adjacent grounds, including a schedule for areas requiring more frequent inspection/monitoring (e.g., food storage, preparation and serving areas).	20	_____
4. If outside contractors provide pest control services, a written contract is signed identifying specific IPM practices to be used including regular inspections, monitoring where appropriate, record-keeping and agreement to abide by the IPM Policy and IPM Plan, including use of only Reduced-Risk or Least-Risk Options for schools pursuing certification. *If outside contractors are not used, score as N/A.*	20	_____
5. A Pest Sightings/Damage Log is kept in a designated area (e.g., main office). Building staff are instructed to report all pest-related incidents to the log including date, time, exact location, a description of the pest or pest damage and the name of the person reporting. Pest Manager reviews reports promptly and records and dates responses taken to each report. *This log may be part of a general maintenance reporting system.*	20	_____
6. School notifies all students, staff and others requesting special consideration in the event of a pesticide application:		
a) school provides direct notification to those individuals at least 48 hours in advance of any pesticide application; and	10	_____
b) school communicates that this notification option is available to parents and staff at least annually.	10	_____

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Exceptions may be made for applications made where an imminent threat to health exists (e.g., stinging insects), or for applications of pesticides defined as Least-Risk (Appendix A), or for situations where the school will be unoccupied for five days following the application. For emergency applications, postings must be placed as soon as practical.

7. Key staff (e.g., IPM Coordinator, Pest Manager, custodians, food service) participate in IPM training at least annually. Training is adequate and appropriate to the IPM roles fulfilled by these staff members. 20 _____

Section 2. Inspection, Sanitation and Exclusion

1. A comprehensive inspection of all buildings is conducted by an in-house or contracted professional Pest Manager for defects including cracks, crevices and other pest entryways; food, moisture and shelter resources available to pests; moisture, pest or other damage to structural elements; termite earthen tunnels, pest fecal matter or other signs of pest activity; etc. A report of all defects is prepared, corrective actions are identified. 20 _____

2. Legible records are maintained of inspection results, pest management actions and evaluations of results and maintained for at least three years. 20 _____

3. A timeline is established for completion of corrective actions and evaluation of results. 20 _____

Section 3. Pest and Pesticide Risk Management

1. Pesticide inventories are maintained only if personnel properly licensed to apply those pesticides are on staff. Storage is tightly controlled to prevent unauthorized access. *If pesticide inventories are not maintained by the school, score as N/A.* 20 _____

2. Baits (e.g., for ants, cockroaches, rodents), if used, are:

   a) placed in areas inaccessible or off-limits to children; 5 _____

   b) placed in a locked, distinctively marked, tamper-resistant container designed specifically for holding baits and constructed of metal, plastic or wood; 5 _____

   c) used in bait containers securely attached to floors, walls, etc. such that the container cannot be picked up and moved; 5 _____

   d) placed in the baffle-protected feeding chamber of the bait container and not in the runway; 5 _____

   e) parafinized or weatherproof if used in wet areas ; and 5 _____

   f) not used outdoors unless bait containers are inaccessible to children (e.g., placed underground in pest nests or on building roofs). 5 _____

   If pests are managed effectively without baits, score as N/A.

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3. If dust formulations are used, these are applied only to areas that are sealed after treatment (e.g., wall voids) to prevent exposure of students to airborne dust particles. *If pests are managed effectively without dusts, score as N/A.*	20	_____
4. Reduced-Risk or Least-Risk Options are the only methods used.	20	_____
Total MODULE TWO IPM Points Available	**285**	
Total Points Not Applicable	_____	
Total MODULE TWO Points Earned		_____

Note items requiring additional action:

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MODULE THREE: Administrative & Policy Practices for School Buildings

Section 1. IPM Planning and Communication	Points Available	Points Earned
1. ***Priority***: The IPM Plan includes a list of key pests and action thresholds for each key pest (even if threshold is one, i.e., no tolerance).	20	
2. **Priority:** The IPM Plan includes a list of management options to be used when key pest problems occur and specifies lesser risk options (e.g., sanitation, exclusion) to be used before resorting to actions with greater risk factors. (See Appendix A for discussion on risk ranking.)	20	
3. The IPM Plan includes a list of actions to prevent and avoid key pest problems (e.g., building maintenance and repair, waste handling equipment upgrades) and a timeline for implementation.	20	
4. If outside professional pest management contractors are used, bids are evaluated not only on the basis of cost but also on contractor:		
a) experience and performance history with an IPM approach;	5	
b) ability to conduct preventative inspections;	5	
c) ability to apply treatments after school hours; and	5	
d) demonstrated practice of using lowest risk control options first.	5	
If outside contractors are not used, score as N/A.		
5. The IPM plan specifies policies for new or renovated building design that include opportunities for Pest Manager input regarding preventative and avoidance strategies for pests.	10	
6. School notifies staff and parents at least 48 hours in advance of the application of any pesticide not on the Least-Risk Pest Control Option List. Such notification may be incorporated in any notice being sent to staff or parents meeting the 48-hour advance timing. *Exceptions may be made for applications made for emergencies, where an imminent threat to health exists (e.g., stinging insects). For emergency applications, notification must be made as soon as practical.*	10	
7. ***Bonus:*** Teachers incorporate school building IPM, or general IPM concepts into curricula and/or class projects.	*10*	
Section 2. Inspection, Exclusion and Sanitation		
1. A written IPM inspection checklist or form is used for periodic inspections, listing each building feature (e.g., foundation, eaves, etc.) and room to be inspected, including specific locations within features or rooms (e.g., vents, storage closets) to be included in the inspection, and specific conditions to be noted (e.g., repair, cleaning needs).	10	
2. Building eaves, walls and roofs are inspected at least quarterly (e.g., for bird and other nests, puddling, etc.) and these conditions are corrected.	10	

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3. Vegetation, shrubs and wood mulch are kept ≥ 12 in. away from structures.	10	_____
4. Tree limbs and branches that might provide vertebrate pest access to structures are maintained at least 6 ft. away from structures (10 ft. if tree squirrels are a problem).	10	_____
5. Exterior doors throughout the building are kept shut when not in use.	10	_____
6. Windows and vents are screened or filtered.	10	_____
7. Weather stripping and door sweeps are placed on doors to exclude pest entry and are maintained in good condition.	10	_____
8. Cracks and crevices in walls, floors and pavement are corrected.	10	_____
9. Openings around potential insect and rodent runways (electrical conduits, heating ducts, plumbing pipes) are sealed.	10	_____
10. Floor drains are screened.	5	_____
11. Sewer lines are in good repair.	5	_____
12. Pest Manager inspects all new construction for conditions conducive to pests (e.g., unsealed pipe chases or electrical conduits; potential bird roosts or nesting areas, etc.).	5	_____
13. Floors are cleaned (free from spillage) and carpets vacuumed daily in areas where food is served, and at least weekly in other areas.	10	_____
14. Pest management roles communicated to staff and students include removing food or food wrappers from lockers and desks on a daily basis.	10	_____
15. Lockers and desks are emptied and thoroughly cleaned at least twice per year (e.g., winter break and at the end of each school year).	10	_____
16. **Bonus:** Lockers and desks are emptied and thoroughly cleaned at least **three times** per year (e.g., winter and spring breaks and at the end of each school year).	*10*	_____
17. Any food items on hand in classrooms (e.g., snack food in kindergartens) at end of year are removed.	10	_____
18. Students are advised at the start of the school year not to exchange hats, combs or hairbrushes.	10	_____
19. Incoming shipments of food products, paper supplies, etc. are inspected for pests and rejected if infested.	10	_____
20. Stored products are rotated on a "first in, first out" basis to reduce potential for pest harborage and reproduction.	10	_____
21. Inspection aisles (≥ 6" x 6") are maintained around bulk stored products.	10	_____

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Bulk stored products are not permitted direct contact with walls or floors, allowing access for inspection and reducing pest harborages.

22. Potential pest food items used in classrooms (e.g., beans, plant seeds, pet food and bedding, decorative corn, gourds) are refrigerated or stored in glass or metal containers with pest-proof lids. 10 _____

23. Food products not delivered in pest-proof containers (e.g., paper, cardboard boxes) and not used immediately are stored refrigerated or transferred to pest-proof containers. 10 _____

24. **Bonus:** Empty food/beverage containers to be recycled are washed with soapy water before storage to remove food residue, stored refrigerated or in pest-proof containers. *10* _____

25. Food-contaminated dishes, utensils, surfaces are cleaned by the end of each day. 10 _____

26. Wiping cloths are disposable or laundered daily. 10 _____

27. Mops and mop buckets are properly dried and stored (e.g., mops hung upside down, buckets emptied). 10 _____

28. Surfaces in food preparation and serving areas are regularly cleaned of any grease deposits. 10 _____

29. Appliances and furnishings in these areas that are rarely moved (e.g., refrigerators, freezers, shelve units) receive a thorough cleaning around and under to remove accumulated grease, dust, etc., at least monthly. 10 _____

30. Vending machines are maintained in clean condition inside and out. 10 _____

31. **Bonus:** Food and beverages are allowed only in limited designated areas. *10* _____

32. Waste materials in all rooms within the school building are collected and removed to a dumpster, compactor or designated pickup location daily. 10 _____

33. Packing and shipping trash (bags, boxes, pallets) is promptly and properly disposed of or recycled. 10 _____

34. Food waste from preparation and serving areas is stored in sealed plastic bags before removal from school grounds. 10 _____

35. **Bonus:** Waste with liquid food residues (e.g., milk cartons, juice boxes) are drained of excess moisture before discarding. *10* _____

36. Animal wastes from classroom pets or laboratory animals are flushed or placed in sealed containers before disposal. *If pets and animals are not present, score as N/A.* 10 _____

37. Trash/recycling rooms, compactors and dumpsters are regularly inspected and spills cleaned up and leaks repaired promptly. 10 _____

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38. Indoor garbage is kept in lined, covered containers and emptied daily.	10	_____
39. All garbage cans and dumpsters are cleaned regularly.	10	_____
40. Outdoor garbage containers and storage are placed away from building entrances.	10	_____
41. Outdoor garbage containers, dumpsters, compactors and storage are placed on hard, cleanable surfaces.	10	_____
42. Outdoor garbage containers have spring-loaded lids to exclude pests.	10	_____
43. Stored waste is collected and moved off site at least once weekly.	10	_____
44. **Bonus:** Stored waste is collected and moved off site at least **twice weekly.**	*10*	_____
45. Recyclables are collected and moved off site at least weekly.	10	_____
46. **Bonus:** Recyclables are collected and moved off site at least **twice weekly.**	*10*	_____
47. Floor and sink drain traps are kept full of water.	10	_____
48. In food service areas, drain covers are removed and drains are cleaned weekly (e.g., with a long-handled brush and cleaning solution).	10	_____
49. In other areas, such as drains under refrigeration units, drains are cleaned monthly.	10	_____
50. **Bonus:** Out-of-date charts or paper notices are removed from walls monthly.	*10*	_____
51. Furniture in classrooms and offices that are rarely moved (e.g., staff desks, bookcases, filing cabinets) receive a thorough cleaning around and under to remove accumulated lint, etc., at least annually.	10	_____
52. Vent or heater filters are cleaned or replaced as per manufacturer's recommended interval or more frequently.	10	_____
53. **Bonus:** The inside of vents and ducts are inspected at least every three years and cleaned by a certified contractor when needed.	*10*	_____
54. Moisture sources are corrected (e.g., ventilate areas where condensation forms frequently, repair plumbing, roof leaks, dripping air conditioners).	10	_____
55. **Bonus:** Permanent bulletin boards, mirrors and other wall fixtures are caulked.	*10*	_____
56. **Bonus:** Trash/recycling storage rooms are refrigerated.	*10*	_____
57. **Bonus:** Purchases of new kitchen appliances and fixtures are of pest-resistant design (i.e., open design, few or no hiding places for roaches, freestanding and on casters for easy thorough cleaning).	*10*	_____

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58. **Bonus:** Purchases of new office and classroom furniture that is rarely moved (e.g., staff desks, bookcases, filing cabinets) are of a design that permits complete cleaning under and around the furniture, or ready movement for cleaning purposes. *10* _____

Section 3. Pest and Pesticide Risk Management

1. **Priority:** When pest problems requiring action occur, appropriate lesser risk options are used first. 20 _____

2. If baits or traps of any kind are used:

   a) a map or floor plan of each area where baits or traps are located is prepared; 5 _____

   b) each bait station or trap is numbered and entered on the map; 5 _____

   c) they are marked with appropriate warning language; and 5 _____

   d) they are checked at least once per month. 5 _____

   If pests are managed effectively without baits or traps, score as N/A.

3. Inventory is managed to track current stock and use and ensure proper disposal of unused materials and empties. *If pesticide inventories are not maintained by the school, score as N/A.* 10 _____

4. Food that has come in direct contact with pests (e.g., ants, cockroaches, mice) is considered contaminated and is discarded. 10 _____

5. **Bonus:** Least-Risk Options are the only pest controls used. *10* _____

6. **Bonus:** No pesticides are stored on school grounds. *10* _____

7. **Bonus:** No pesticides are applied for pests causing aesthetic damage only. *10* _____

8. **Bonus:** Teachers incorporate pest and pesticide risk management into curricula and/or class projects. *10* _____

Total MODULE THREE Administration and Policy IPM Points Available **605**

Total Points Not Applicable _____

Total MODULE THREE Administration and Policy IPM Points Earned _____

About MODULE THREE IPM Practices

Not all MODULE THREE IPM practices are appropriate for all schools. Choose the ones that will be most effective for your IPM program. For certification, you must implement enough practices to earn an overall 70% score for all three modules, including applicable pest-specific sections. Most schools will need to complete just a few of the pest-specific sections.

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Note items requiring additional action:

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MODULE THREE: Pest-Specific IPM Practices for School Buildings

Section 4. Ants

For Carpenter Ants, see section 16.0; for Fire Ants, see section 14.0.

Common Key Pests in Schools		Points Available	Points Earned
	1. **Priority:** Action thresholds for key ant pests are defined in the IPM Plan and effectively implemented.	20	
	2. When ant problems occur, ants are identified correctly before taking action. Actions are appropriate for the problem ant.	20	
	3. When ant problems occur, contributing factors are identified and corrected (e.g., seal cracks or crevices, resolve sanitation problems).	20	
	4. Pest management roles communicated at least annually to maintenance and food preparation/serving staff include preventative sanitation, prompt reporting of ant problems, and killing or removing lone, wandering ant "scouts" whenever they are spotted in buildings.	5	
	5. Non-bait insecticides are used for ants only at the nest. *If ants are managed effectively without non-bait insecticides, score as N/A.*	10	
	6. Insecticide baits (*If ants are managed effectively without baits, score as N/A*):		
	a) are used only against species for which baiting has been shown to be effective (e.g., Harvester and Pharaoh Ants; plus Argentine, Big Headed, Ghost, Little Black, Odorous House, Pavement, Pyramid, Small Honey Ants if nests cannot be located; and not Large Yellow Ants; these may change as new baits become available);	5	
	b) are used only if a thorough inspection is undertaken to ensure that baits are placed along all active trails as close to the nest as possible (including outside the building, inside electrical outlets and fixtures, etc.);	5	
	c) **Bonus:** are checked for feeding within 48 hours of placement, and replaced with an alternate bait if no feeding activity occurs;	5	
	d) are replenished as long as feeding activity persists; and	5	
	e) are used only if ants are denied access to all alternate food sources during baiting programs.	5	
	7. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for ant management.	5	
	8. **Bonus:** Pest Manager can identify pest ants common to the region on sight (e.g., Big-Headed Ant, Argentine Ant, Fire Ant, Odorous House Ant, Pavement Ant, Pharaoh Ant, Thief Ant), and knows their typical nesting sites.	*10*	
	9. **Bonus:** Teachers incorporate IPM for ants into curricula and/or class projects.	*10*	

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10. Least-Risk Options are the only methods used for ant management. 5 _____

Total Points Available for Ant Management 105

Total Points Not Applicable ____

Total Points Earned for Ant Management _____

"Proper identification is the most important skill to master, for without the identity of the target ant, one will not know its habits, and therefore, where to look for its nest location. Not locating ant colonies is the primary cause of ant control failures."

- Excerpt from Hedges 1997

About KEY PESTS

A key pest is one that is usually encountered at unacceptable levels at least once each school year. Geographic region and climate; surrounding landscape features; and type of construction, age and condition of school buildings influence which pests become key pests for your school.

Typical key pests in and around school buildings include ants, birds, cockroaches, head lice, yellowjackets and rodents.

Routine or regularly scheduled pesticide applications can mask key pests, which may not become apparent for some time after routine pesticide applications have been stopped.

For key pests, it makes sense to plan ahead and determine which inspection and monitoring procedures will be used to detect problems early, and how many pests or how much pest damage can be tolerated before taking action.

Resources for Ant Management:

Daar *et al.*, 1997. Chapter 5. IPM for ants in schools. Pp. 27-34. *In* IPM for Schools: A How-to Manual. US EPA. *Line drawings, identification, communication, monitoring, management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Flint, M.L., ed., 2000. Pests of Home and Landscape. University of California Statewide IPM Project. *Color images, description, biology and management.* Available at http://www.ipm.ucdavis.edu/PMG/selectnewpest.home.html

Hedges, S. A., 1992. Field Guide for the Management of Structure-Infesting Ants. 155 pp. *Color and B&W photos, line drawings, identification keys, biology, management.* Available from GIE Media, (800) 456-0707.

Hedges, S. A., 1997. Chapter 12. Ants. Pp. 503-589. *In* Handbook of Pest Control, A. Mallis, ed. *Color and B&W photos, line drawings, identification keys, biology, management.* Available from GIE Media, (800) 456-0707.

Koehler *et al.*, 1999. School IPM Web Site. University of Florida. *Ant IPM checklist, ant trails fact sheet, downloadable presentation (html, Acrobat or Powerpoint) on IPM for ants in schools.* Available at http://www.ifas.ufl.edu/~schoolipm/

Pinto, L., 1998. Ants. *In* The National Park Service Integrated Pest Management Manual, T. Cacek, ed. *Line drawings, identification, biology, management.* Available at http://www1.nature.nps.gov/wv/ipm/ants.htm

Smith, E.H. and R.C. Whitman, 1999. NMPA Field Guide to Structural Pests. 800 pp. *Color photos, identification, biology, management for 22 ant species.* Available from National Pest Management Association Inc., 8100 Oak Street, Dunn Loring VA 22027. (703) 573-8330, FAX (703) 573-4116, Web site http://www.pestworld.org/homeowners/resource-center/field_guide/field_guide.html

Stauffer *et al.*, 1998. Ants. Pp. 4-21 to 4-27. *In* IPM Workbook for New York State Schools. *Biology, identification, monitoring, management.* Available at http://www.nysaes.cornell.edu/ipmnet/ny/urban/workbook_final.pdf

Stier *et al.*, 1999. Section 5: Indoor pest management. *In* Wisconsin's School Integrated Pest Management Manual. *Limited color photos, identification keys, biology, management checklist.* Available at http://ipcm.wisc.edu/programs/school/default.htm

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Common Key Pests in Schools

Section 5. Birds

[ ] NOT APPLICABLE (*Check here if birds are not a problem requiring action in your school and proceed to the next section.*)

		Points Available	Points Earned
1.	**Priority:** Persons handling bird traps, inspecting bird roosts, cleaning bird mess or removing bird nests are trained in proper hygiene and wear appropriate protective gear.	20	
2.	**Priority:** Action thresholds for key bird pests are defined in the IPM Plan and effectively implemented.	20	
3.	When bird problems occur, birds are identified correctly before taking action. Actions are appropriate for the problem bird.	20	
4.	When bird problems occur, contributing factors are identified and corrected (e.g., roosts on buildings or trees on school grounds are modified with repellant gels, spikes, pruning, etc.).	20	
5.	Traps or other surfaces contaminated with bird droppings are properly disinfected or disposed of.	10	
6.	Methods that result in harm to birds (toxic baits, lethal traps) are used only by certified applicators and only after non-lethal methods (exclusion, repellants) have been proven ineffective. *If birds are managed effectively with non-harmful methods only, score as N/A.*	10	
7.	Pest management roles communicated at least annually to building staff include prompt reporting of bird problems and personal health issues regarding bird droppings.	5	
8.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for problem bird management.	5	
9.	Roost modification (e.g., with netting, sticky gels, wire, spikes, tree pruning, nest removal, etc.) is undertaken prior to or after nesting season, unless there is an immediate health concern (e.g., nesting in or near vents, accumulation of fecal matter).	5	
10.	Roosting surfaces to be modified are thoroughly cleaned prior to application of netting, gels, wires or spikes.	5	
11.	**Bonus:** Pest Manager can identify problem birds commonly found in the region on sight (e.g., geese, gulls, pigeons, sparrows, starlings, woodpeckers).	*10*	
12.	**Bonus:** Teachers incorporate IPM for problem birds into curricula and/or class projects.	*10*	
13.	Least-Risk Options are the only methods used for problem bird management.	5	

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Total Points Available for Bird Management **125**

Total Points Not Applicable ____

Total Points Earned for Bird Management _____

Resources for Bird Management:

Timm, R.M. and R.E. Marsh, 1997. Chapter 21. Vertebrate Pests. Pp. 955-1019. *In* Handbook of Pest Control, A. Mallis, ed. *Color and B&W photos, line drawings, identification keys, biology, management of sparrows, pigeons, starlings and woodpeckers.* Available from GIE Media, (800) 456-0707.

Koehler *et al.*, 1999. School IPM Web Site. University of Florida. *Technical information on non-pesticidal products for bird management.* Available at http://www.ifas.ufl.edu/~schoolipm/

National Audubon Society. Available at http://www.audubon.org/

Smith, E.H. and R.C. Whitman, 1999. NMPA Field Guide to Structural Pests. 800 pp. *Color photos, identification, biology, management for six bird species.* Available from National Pest Management Association Inc., 8100 Oak Street, Dunn Loring VA 22027. (703) 573-8330, FAX (703) 573-4116, Web site http://www.pestworld.org/homeowners/resource-center/field_guide/field_guide.html

Stauffer *et al.*, 1998. Birds. Pp. 4-31 to 4-33. *In* IPM Workbook for New York State Schools. *Identification, biology, management.* Available at http://www.nysaes.cornell.edu/ipmnet/ny/urban/workbook_final.pdf

Stier *et al.*, 1999. Section 4: Outdoor vertebrate pest management. *In* Wisconsin's School Integrated Pest Management Manual. *Canadian geese, pigeons, biology, management.* Available at http://ipcm.wisc.edu/programs/school/default.htm

United States Fish and Wildlife Service. Office of Migratory Bird Management. *Conservation, monitoring, regulations pertaining to migratory birds, including links to educational and other bird-related Web sites.* Available at http://migratorybirds.fws.gov/

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Section 6. Cockroaches

[ ] **NOT APPLICABLE** *(Check here if cockroaches are not a problem requiring action in your school and proceed to the next section.)*

		Points Available	Points Earned
Common Key Pests in Schools	1. **Priority:** Action thresholds for key cockroach pests are defined in the IPM Plan and effectively implemented.	20	
	2. When cockroach problems occur, the problem cockroach is identified before taking action. Actions are appropriate for the problem cockroach.	20	
	3. When cockroach problems occur, contributing factors are identified and corrected (e.g., seal cracks or crevices, drill and treat hollow walls).	20	
	4. **Priority:** An inspection/monitoring program for cockroaches is specified in the IPM Plan and implemented to detect problems early and indicate cockroach movement patterns and potential infestation sources.	20	
	5. If non-bait insecticide applications are used, insecticides are not permitted to come in contact with monitoring traps or surfaces near traps. *If cockroaches are managed effectively without non-bait insecticides, score as N/A.*	10	
	6. Pest management roles communicated at least annually to maintenance and food preparation/maintenance staff include preventative sanitation and prompt reporting of cockroach problems.	5	
	7. Public health officials involved in regulating and inspecting food preparation and serving areas in schools are made aware of the school's IPM Policy, IPM Plan and cockroach monitoring procedures.	10	
	8. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for cockroach management.	5	
	9. **Bonus:** Pest Manager can identify cockroaches common to the region on sight (e.g., American, Australian, Brown-Banded, German, Oriental).	*10*	
	10. **Bonus:** Teachers incorporate IPM for cockroaches into curricula and/or class projects.	*10*	
	11. Least-Risk Options are the only methods used for cockroach management.	5	
	Total Points Available for Cockroach Management	**115**	
	Total Points Not Applicable		
	Total Points Earned for Cockroach Management		

A Cockroach a Day...

"In an 1886 issue of the New York Tribune, the curious medical practices in Louisiana were described. These included the prescribing of cockroach tea for tetanus, supplemented by a poultice of boiled roaches over the wound. The Blattaria were also fried in oil with garlic -- a time-honored treatment for indigestion. Years later, the legendary New Orleans jazz singer Louis Armstrong recalled being served a broth made from several boiled roaches, whenever he was ill. Whether this treatment soothed or caused Armstrong's gravelly voice has yet to be resolved."

- Excerpt from "The Compleat Cockroach" by David G. Gordon, Ten Speed Press

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Resources for Cockroach Management:

Benson, E. P. and P. A. Zungoli, 1997. Chapter 3. Cockroaches. Pp. 122-203. *In* Handbook of Pest Control, A. Mallis, ed. *Color and B&W photos, line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Daar *et al.*, 1997. Chapter 6. IPM for cockroaches in schools. Pp. 35-48. *In* IPM for Schools: A How-to Manual. *Line drawings, identification, communication, monitoring, management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Flint, M.L., ed., 2000. Pests of Home and Landscape. University of California Statewide IPM Project. *Color images, description, biology and management.* Available at http://www.ipm.ucdavis.edu/PMG/selectnewpest.home.html

Gordon, D. G., 1996. The Compleat Cockroach: A Comprehensive Guide to the Most Despised (and Least Understood) Creature on Earth. 192 pp. ISBN 0898158532. Ten Speed Press, Berkeley, CA. (510) 559-1600. More information at http://www.olympus.net/biz/dggordon/index.htm

Koehler *et al.*, 1999. School IPM Web Site. University of Florida. *Technical information on non-pesticidal products for cockroach management, inspection, identification, monitoring, identification, downloadable presentation (html, Acrobat or Powerpoint) on IPM for cockroaches in schools.* Available at http://www.ifas.ufl.edu/~schoolipm/

Ogg, B., D. Ferraro and C. Ogg, 1996. Cockroach Control Manual. University of Nebraska Cooperative Extension. *Color images of adults and egg cases, identification, biology, least-risk management, public health issues.* Available at http://www.ianr.unl.edu/ianr/pat/cocktoc.htm

Smith, E.H. and R.C. Whitman, 1999. NMPA Field Guide to Structural Pests. 800 pp. *Color photos, identification, biology, management for 15 cockroach species.* Available from National Pest Management Association Inc., 8100 Oak Street, Dunn Loring VA 22027. (703) 573-8330, FAX (703) 573-4116, Web site http://www.pestworld.org/homeowners/resource-center/field_guide/field_guide.html

Stauffer *et al.*, 1998. Cockroaches. Pp. 4-4 to 4-9. *In* IPM Workbook for New York State Schools. *Biology, identification, monitoring, management.* Available at http://www.nysaes.cornell.edu/ipmnet/ny/urban/workbook_final.pdf

Stier *et al.*, 1999. Section 5: Indoor pest management. *In* Wisconsin's School Integrated Pest Management Manual. *Color photos, management checklist.* Available at http://ipcm.wisc.edu/programs/school/default.htm

CASE STUDY: Cockroaches at Peabody Charter School

"Cockroaches have been a perpetual problem at Peabody Charter School. Teachers reported flicking on the lights at night and having to tiptoe through the swarming insects. To control the roaches, teachers either sprayed with neurotoxic pesticide or stepped on them. Like many old Santa Barbara schools, the problem was one of habitat, not sanitation. Basically, the occupants maintained a very high tolerance for the pests.

Identification: The insect was identified by the Agricultural Commissioner's office as the Oriental Cockroach (*Blatta orientalis*).

Information: Research indicated the preferred habitat is low, moist, dark areas, and revealed that Oriental roaches do not like to climb. This information alone allowed the IPM team to limit its time and materials to areas of preferred habitat, and prevented unnecessary action in areas of greater human activity, such as countertops.

Observation and Record Keeping: Monitoring traps were placed broadly throughout the building to show areas of high pest activity and direction of travel. This narrowed the treatment area yet further, and prevented unnecessary pesticide applications.

Action: Treatments were made with caulk, low toxicity baits placed in inaccessible areas, and a very light dusting of boric acid in inaccessible voids.

Evaluation and Modification: Continued monitoring aided in refinement of bait station placement. Roach numbers dropped from an average of 8.25 (and a high of 20) per trap before treatment, to an average of 3.3 six weeks after initial treatment. This number dropped even further 12 weeks after treatment to an average 0.5 per trap. Traps were monitored on 14-day cycles, with the number of traps reduced after treatment, based on need. One year after treatment, cockroach populations continue to be suppressed."

- Excerpt from Reducing Pesticides in Schools: How Two Elementary Schools Control Common Pests Using IPM Strategies, Available at http://www.grc.org/cec/pubs/IPM_report2.html

Section 7. Fleas

[ ] NOT APPLICABLE *(Check here if fleas are not a problem requiring action in your school and proceed to the next section.)*

		Points Available	Points Earned
1.	**Priority:** Action thresholds for fleas are defined in the IPM Plan and effectively implemented.	20	
2.	When flea problems are confirmed, contributing factors are identified and corrected (e.g., rodent or wildlife problems are resolved, domestic animal access is restricted, classroom pets are checked for fleas).	20	
3.	Pest management roles communicated at least annually to school staff working with classroom pets include preventative sanitation and prompt reporting of flea problems.	5	
4.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for flea management.	5	
5.	When flea problems occur, affected areas are cleared of clutter. These areas are vacuumed daily, with special attention to difficult locations where dust and dirt accumulate that may harbor flea larvae: cracks and crevices, junctions of floor and walls, under furniture, in closets, and window sills and shelves near classroom pets or lab animals. After vacuuming, vacuum bags are sealed and removed from the premises.	5	
6.	**Bonus:** When flea problems persist in buildings, fleas are identified to species to help determine the source of the problem.	*10*	
7.	**Bonus:** Teachers incorporate IPM for fleas into curricula and/or class projects.	*10*	
8.	Least-Risk Options are the only methods used for flea management.	5	
	Total Points Available for Flea Management	**60**	
	Total Points Earned for Flea Management		

Resources for Flea Management:

Casey, C., 1998. Fleas. *In* The National Park Service Integrated Pest Management Manual, T. Cacek, ed. *Identification, biology, management.* Available at http://www1.nature.nps.gov/wv/ipm/fleas.htm

Daar *et al.*, 1997. Chapter 8. IPM for fleas in schools. Pp. 27-34. *In* IPM for Schools: A How-to Manual. *Line drawings, monitoring, management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

So, naturalists observe, a flea
Hath smaller fleas that on him prey;
And these have smaller still to bite 'em;
And so proceed ad infinitum.
Thus every poet in his kind,
Is bit by him that comes behind.

- Jonathan Swift

Dryden, M. W., 1997. Chapter 16. Fleas. Pp. 747-770. *In* Handbook of Pest Control, A. Mallis, ed. *Color and B&W photos, line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Flint, M.L., ed., 2000. Pests of Home and Landscape. University of California Statewide IPM Project. *Color images, description, biology and management.* Available at http://www.ipm.ucdavis.edu/PMG/selectnewpest.home.html

Koehler *et al.*, 1999. School IPM Web Site. University of Florida. *Technical information on non-pesticidal products for flea management.* Available at http://www.ifas.ufl.edu/~schoolipm/

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Section 8. Flies, Gnats & Midges

Common Key Pests in Schools

		Points Available	Points Earned
1.	**Priority:** Action thresholds for key fly, gnat or midge pests are defined in the IPM Plan and effectively implemented.	20	
2.	When fly, gnat or midge problems occur, the problem pest is identified before taking action. Actions are appropriate for the problem pest.	20	
3.	When fly, gnat or midge problems occur, contributing factors are identified and corrected (e.g., repair leaking drains, repair/install screens and vent filters, allow potted plant soil to dry out between waterings for fungus gnats, correct breeding sites for fruit flies, etc.).	20	
4.	Pest management roles communicated at least annually to maintenance and food preparation/serving staff include preventative sanitation and exclusion and prompt reporting of fly, gnat or midge problems.	5	
5.	If fly traps are used for monitoring or population suppression (*If flies are managed effectively without traps, score as N/A*):		
	a) these are permitted for use where children are present (check label);	5	
	b) they are serviced properly (e.g., sticky traps are replaced when dry or fly-covered, ensure baits are not used as fly breeding sites);	5	
	c) outdoor, baited traps are placed as close to breeding areas as possible; and	5	
	d) all traps are placed away from building entrances.	5	
6.	Public health officials involved in regulating and inspecting food preparation and serving areas in schools are made aware of the schools IPM Policy, IPM Plan and pest fly monitoring procedures.	10	
7.	Fly specks are not allowed to accumulate on walls, windows, ceilings, drains, etc., indoors or out.	10	
8.	Surfaces with fly specks are thoroughly cleaned with water plus detergent to remove any residual odor.	5	
9.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for fly, gnat or midge management.	5	
10.	Any fruit left unrefrigerated for ripening is placed in container that does not allow fruit fly access (e.g., a paper bag with top sealed by folding and clipping with clothespin or paper clip). *If fruit is not left unrefrigerated, score as N/A.*	5	
11.	Dumpsters or other outside trash storage containers are positioned so as to avoid drawing flies to building entrances.	5	
12.	Soil around dumpsters or dumpster pads is regularly inspected for liquid-soaked, odorous areas where flies may breed. These areas are scraped and soil collected, sealed in a plastic bag and disposed of.	5	

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13. Where flies are a persistent problem, frequently used entrances are equipped with vertical plastic strip barriers, fans directing air down and out, or "air walls" that allow human access but prevent fly entry. *If flies are managed effectively without these, score as N/A.*	5	_____
14. Indoor and outdoor lighting is shielded, of a color less attractive to insects than white, or placed at a sufficient distance from building entrances to avoid drawing flying insects into buildings.	5	_____
15. **Bonus:** Pest Manager can identify fly, gnat and midge pests common to the region on sight (e.g., blow flies, bottle flies, cluster flies, dump flies, fruit flies, houseflies, phorid flies; fungus gnats).	*10*	_____
16. **Bonus:** Teachers incorporate IPM for flies, gnats and midges into curricula and/or class projects.	*10*	_____
17. Least-Risk Options are the only methods used for fly, gnat or midge management.	5	_____
Total Points Available for Fly, Gnat and Midge Management	**145**	
Total Points Not Applicable		____
Total Points Earned for Fly, Gnat and Midge Management		_____

Resources for Fly, Gnat and Midge Management:

Daar *et al.*, 1997. Chapter 5. IPM for flies in schools. Pp. 63-70. *In* IPM for Schools: A How-to Manual. *Line drawings, identification, communication, monitoring, management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Dame, D.A. and T.R. Fasulo, eds., 2000. Flies. 16 pp. *Limited line drawings, description, biology, monitoring, management of flies associated with public health issues.* Available at http://www.ifas.ufl.edu/~pest/vector/

Ehmann, N.R., 1997. Chapter 7. Flies, gnats and midges. Pp. 773-834. *In* Handbook of Pest Control, A. Mallis, ed. *Color, B&W photos, line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Flint, M.L., ed., 2000. Pests of Home and Landscape. University of California Statewide IPM Project. *Line drawings, description, biology and management.* Available at http://www.ipm.ucdavis.edu/PMG/selectnewpest.home.html

Genetics Society of America, 1997. Flybase Web Site. *Curriculum aid: B&W photos, line art, advanced genetics of Drosophila fruit flies.* Available at http://flybase.bio.indiana.edu:82/

Hedges, S.A., 1993. Field Guide for the Management of Structure-Infesting Flies. 151 pp. *Color and B&W photos, line drawings, identification keys, biology, management.* Available from GIE Media, (800) 456-0707.

Koehler *et al.*, 1999. School IPM Web Site. University of Florida. *Technical information on non-pesticidal products for fly, gnat and midge management.* Available at http://www.ifas.ufl.edu/~schoolipm/

Smith, E.H. and R.C. Whitman, 1999. NMPA Field Guide to Structural Pests. 800 pp. *Color photos, identification, biology, management for 9 fly species.* Available from National Pest Management Association Inc., 8100 Oak Street, Dunn Loring VA 22027. (703) 573-8330, FAX (703) 573-4116. Web site http://www.pestworld.org/homeowners/resource-center/field_guide/field_guide.html

Stauffer *et al.*, 1998. Flies. Pp. 4-28 to 4-30. *In* IPM Workbook for New York State Schools. *Biology, identification, monitoring, management.* Available at http://www.nysaes.cornell.edu/ipmnet/ny/urban/workbook_final.pdf

Stier *et al.*, 1999. Section 5: Indoor pest management. *In* Wisconsin's School Integrated Pest Management Manual. *Limited color photos, management checklist.* Available at http://ipcm.wisc.edu/programs/school/default.htm

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Section 9. Head Lice

Common Key Pest in Schools

		Points Available	Points Earned
1.	**Priority:** School rooms are never treated with pesticides for head lice.	20	
2.	**Priority:** When head lice are detected, all children in the classroom are checked for lice and any students found infested are sent home with a minimum of disruption until free of lice and nits.	10	
3.	Parents of all children in classrooms where lice infestations are found are provided with information on lice detection and treatment.	10	
4.	**Priority:** Pest management roles communicated to teaching staff of grades six and below include prompt reporting of head lice infestations and instructing students to avoid head-to-head contact.	10	
5.	An annual head lice check is conducted at the beginning of each school year for students of grades six and below.	10	
6.	Sleeping mats or towels brought by students from home to school are individually labeled and not shared, and sent home regularly for washing. *If sleeping mats or towels are not used, score as N/A.*	10	
7.	Students are provided with a way to store coats, hats and scarves is such a way that they are not in contact with those of other students, e.g., adequately spaced coat hooks, cubbies, or labeled plastic bags.	10	
8.	Communications to parents when head lice are detected caution against:		
	a) ineffective and/or dangerous treatments (e.g., pesticide treatment of homes, use of shampoos containing lindane, folk remedies such as gasoline or kerosene treatment of hair);	5	
	b) use of over-the-counter or prescription treatments at greater than the recommended dose or frequency;	5	
	c) treating children not infested with live head lice or viable eggs; and	5	
	d) include information on manual removal of lice and nits.	5	
9.	**Bonus:** Teachers incorporate IPM for head lice into curricula and/or class projects.	*10*	
10.	Information on head lice prevention, detection and reporting and the school's policy on head lice management is sent home with children at the beginning of each school year.	10	
	Total Points Available for Head Lice Management	**110**	
	Total Points Not Applicable		
	Total Points Earned for Head Lice Management		

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Resources for Head Lice Management:

Caffrey, D., P. Girouard, and K. Tucker, 1998. Yikes-Lice! *Head lice infestation and treatment explained in rhyme, aimed towards readers of ages 4 to 8.* 32 pp. Albert Whitman & Co. ISBN: 0807593745.

Daar *et al.*, 1997. Chapter 5. IPM for head lice in schools. Pp. 81-85. *In* IPM for Schools: A How-to Manual. *Line drawings, identification, communication, monitoring, management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Flint, M.L., ed., 2000. Pests of Home and Landscape. University of California Statewide IPM Project. *Color images, description, biology and management.* Available at http://www.ipm.ucdavis.edu/PMG/selectnewpest.home.html

Hedges, S.A., 1997. Chapter 15. Lice, pp. 731-745. *In* Handbook of Pest Control, A. Mallis, ed. *Line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Koehler *et al.*, 1999. School IPM Web Site. University of Florida. *Color photos, frequently asked questions, sample head lice notification letters, biology and control of head lice, downloadable presentation (html, Acrobat or Powerpoint) on IPM for head lice in schools.* Available at http://www.ifas.ufl.edu/~schoolipm/

The National Pediculosis Association. *Information about head lice and scabies management, catalog or related products and information.* National Pediculosis Association, Inc., P.O. Box 610189, Newton MA 02461. (781) 449-6487, FAX (781) 449-8129. Available at http://www.headlice.org/

National Pediculosis Association. Information about lindane, including health effects, ecotoxicity, labels and MSDS sheets, legislation banning/restricting its use. National Pediculosis Association, Inc., P.O. Box 610189, Newton MA 02461. Phone (781) 449-6487, FAX (781) 449-8129. Available at http://www.lindane.org/

Stauffer *et al.*, 1998. Lice. Pp. 4-34 to 4-36. *In* IPM Workbook for New York State Schools. *Biology, identification, monitoring, management.* Available at http://www.nysaes.cornell.edu/ipmnet/ny/urban/workbook_final.pdf

Stier *et al.*, 1999. Section 5: Indoor pest management. In Wisconsin's School Integrated Pest Management Manual. *Color photo, management checklist.* Available at http://ipcm.wisc.edu/programs/school/default.htm

The No Nit Policy: A Healthy Standard for Children and their Families

"The National Pediculosis Association recommends the No Nit Policy as the public health standard intended to keep children lice free, nit free, and in school. Pediculosis represents one of the most common communicable childhood diseases and whether or not we understand how this has evolved, it is important to acknowledge head lice as a problem when raising or caring for children. We can begin to improve the current situation by assuring that the health programs of every school, camp and child care facility operate with an acceptable head lice management protocol.

The Spirit of the No Nit Policy is to minimize head lice infestations as a public health problem and to keep children in school.

The No Nit Policy encourages each family to do its part at home with routine screening, early detection, accurate identification and thorough removal of lice and nits. Establishing consistent guidelines and educating the public about procedures in advance of outbreaks helps minimize inappropriate responses.

Early intervention provides the needed assurance for those who have successfully eliminated an infestation that everything possible is being done to prevent new outbreaks when children return to groups where close contact is inevitable. Repeated exposures to pesticidal products with each infestation put children at risk. Parents need to be informed that chemical treatments may also be dangerous for children with certain pre-existing medical conditions and/or medication regimens. Families with pregnant or nursing mothers should be given advance notice that early detection with manual removal of lice and nits can serve as a safe alternative to pesticidal lice treatment products.

The No Nit Policy calls for:

1. Community education to help parents understand why there is the No Nit Policy and do what they need to do to carry it out.
2. The exclusion of a child from a school, camp or child care setting until all head lice, lice eggs (nits) and egg cases have been removed."

- Excerpt from National Pediculosis Web site, more at http://www.headlice.org/

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Section 10. Microbial Pests	Points Available	Points Earned
1. **Priority:** Tasks requiring cleaning are clearly distinguished from disinfecting tasks.	20	
2. **Priority:** Products used for routine cleaning do not contain disinfectants.	20	
3. **Priority:** When use of a disinfectant is appropriate, the product is used according to all label regulations and instructions.	20	
4. **Priority:** Staff who use cleaning and disinfecting products are adequately trained in appropriate use.	20	
5. **Priority:** Cleaning and disinfecting products are stored in secure areas inaccessible to children	20	
6. Custodial cleaning and disinfectant products are evaluated and selected on the basis of environmental and public health criteria related to their active ingredients, as well as performance and cost.	5	
7. Custodial product suppliers are required to submit information on inert ingredients in addition to active ingredients and this information is used in the evaluation process.	5	
8. Custodial product suppliers are required to certify that no ingredients are used which require reporting under the US EPA's Superfund Amendments and Re-authorization Act (floor care products and metal polishes may be exempted from this requirement).	5	
9. **Bonus:** Teachers incorporate IPM for microbial pests into curricula and/or class projects.	5	
10. **Bonus:** Custodial products in aerosol cans are not used (except graffiti-removal products).	5	
Total Points Available for Microbial Pest Management	**115**	
Total Points Earned for Microbial Pest Management		

Resources for Microbial Pest Management:

American Conference of Governmental Industrial Hygienists, 1999. BioAerosols: Assessment and Control. 200 pp. *Sampling, prevention, remediation of microbial pests, dust mites, antigens.* Available from Kemper Woods Center, 1330 Kemper Meadow Drive, Cincinnati OH 45240-1634. (513) 742-6163, FAX (513) 742-3355, E-mail: comm@acgih.org. More at http://www.acgih.org

City of Santa Monica, CA, 1998. Custodial Products Bid Specifications. 6 pp. *Criteria used to evaluate custodial/maintenance products.* Available at http://www.ci.santa-monica.ca.us/environment/policy/purchasing/bidspecs.htm

Dickey, P., 1998. Purchasing Environmentally Preferable Cleaning Products: A Critical Review of Programs. 88 pp. *Descriptions of programs used by US General Services Administation, states and cities to evaluate cleaning products using health and environmental criteria.* Available from Washington Toxics Coalition, Seattle WA. (206) 632-1545. More at http://www.watoxics.org

US EPA. 2000. Antimicrobial Pesticide Web Site. *Antimicrobial science, registration policy, label review manual.* http://www.epa.gov/oppad001/

The Microbe

The Microbe is so very small
You cannot make him out at all,
But many sanguine people hope
To see him down a microscope.
His jointed tongue that lies beneath
A hundred curious rows of teeth;
His seven tufted tails with lots
Of lovely pink and purple spots,
On each of which a pattern stands,
Composed of forty separate bands;
His eyebrows of a tender green;
All these have never yet been seen -
But Scientists,who ought to know,
Assure us they must be so ...
Oh! Let us never, never doubt
What nobody is sure about!

- H. Belloc, More Beasts for Worse Children, Duckworth, London.

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Section 11. Mosquitoes

[ ] NOT APPLICABLE (*Check here if mosquitoes are not a problem requiring action in your school and proceed to the next section.*)

		Points Available	Points Earned
1.	**Priority:** Action thresholds for key mosquito pests are defined in the IPM Plan and effectively implemented.	20	
2.	An inspection/monitoring program for standing water and/or mosquito larvae and adults is specified in the IPM Plan and implemented to detect and correct problem sites early.	20	
3.	When mosquito problems occur, the problem mosquito is identified before taking action. Actions are appropriate for the problem mosquito.	20	
4.	When mosquito problems occur, contributing factors are identified and corrected (e.g., repair/install screens and vent filters; correct standing water on building roofs, in gutters, drainage sumps or channels, or on school grounds in items that collect water such as tarps, equipment, cans, etc.).	20	
5.	Pest management roles communicated at least annually to maintenance staff include prompt reporting and/or correction of standing water, mosquito problems and safe and effective use of repellants (e.g., as per EPA recommendations).	5	
6.	Public health officials involved in regulating and inspecting mosquito management in schools are made aware of the school's IPM Policy, IPM Plan and mosquito monitoring procedures.	10	
7.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for mosquito management.	5	
8.	**Bonus:** Pest Manager can identify mosquitoes common to the region on sight (e.g., Asian Tiger Mosquito, Common Malaria Mosquito, House Mosquito, Yellow-Fever Mosquito).	*10*	
9.	**Bonus:** Teachers incorporate IPM for mosquitoes and information on diseases vectored by mosquitoes into curricula and/or class projects.	*10*	
10.	Least-Risk Options are the only methods used for mosquito management.	5	
	Total Points Available for Mosquito Management	**105**	
	Total Points Earned for Mosquito Management		

Resources for Mosquito Management:

O'Neill, J., 1997. Chapter 18. Mosquitoes. Pp. 837-880. *In* Handbook of Pest Control, A. Mallis, ed. *Color and B&W photos, line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Flint, M.L., ed., 2000. Pests of Home and Landscape. University of California Statewide IPM Project. *Color images, description, biology and management.* Available at http://www.ipm.ucdavis.edu/PMG/selectnewpest.home.html

Pinto, L., 1998. Mosquitoes. *In* The National Park Service Integrated Pest Management Manual, T. Cacek, ed. *Line drawings, identification, biology, management.* Available at http://www1.nature.nps.gov/wv/ipm/mosquito.htm

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Section 12. Occasional Invaders: Bats, Booklice, Centipedes, Firebrats, Millipedes, Mites, Scorpions, Silverfish, Snakes, Spiders, Ticks

[ ] NOT APPLICABLE *(Check here if these pests are not a problem requiring action in your school and proceed to the next section.)*

		Points Available	Points Earned
1.	When problems with occasional pests occur, the pest is identified before taking action. Actions are appropriate for the problem pest.	20	
2.	Contributing factors are identified and corrected (e.g., repair/install door sweeps, modify nesting sites, adjust humidity, cut high grass, etc.).	20	
3.	Action thresholds and monitoring for occasional pests encountered more than once per year are specified in the IPM Plan and implemented.	20	
4.	Pest management roles communicated to maintenance staff at least annually include prompt reporting of occasional pest problems, humane removal of harmless invaders, and injury prevention and first aid procedures for potentially dangerous pests.	10	
5.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for occasional invader management.	5	
6.	**Bonus:** Pest Manager can identify occasional invaders common to the region on sight.	*10*	
7.	**Bonus:** Teachers take advantage of encounters with occasional pests to educate students on the organisms biology, disease vector potential, behavior, and/or beneficial aspects.	*10*	
8.	Least-Risk Options are the only methods used for occasional invader management.	5	
	Total Points Available for Occasional Invader Management	**80**	
	Total Points Earned for Occasional Invader Management		

Resources for Occasional Invader Management:

Bellow, P., 1997. Chapter 22. Occasional invaders. Pp. 1021-1058. *In* Handbook of Pest Control, A. Mallis, ed. *Color, B&W photos, line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Daar *et al.*, 1997. Chapter 13. IPM for scorpions in schools, pp. 103- 105; Chapter 14. IPM for silverfish, firebrats and booklice in schools, pp. 107-110. *In* IPM for Schools: A How-to Manual. *Line drawings, identification, communication, monitoring, management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Flint, M.L., ed., 2000. Pests of Home and Landscape. University of California Statewide IPM Project. *Color images, description, biology and management.* Available at http://www.ipm.ucdavis.edu/PMG/selectnewpest.home.html

Hedges, S.A., and M.S. Lacey, 1995. Field Guide for the Management of Urban Spiders. 220 pp. *Color, B&W photos, identification keys, biology, management.* Available from GIE Media, (800) 456-0707.

Lacey, M.S., 1997. Chapter 19. Spiders. Pp. 883-913. *In* Handbook of Pest Control, A. Mallis, ed. *Color and B&W photos, line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Cacek, T., ed. The National Park Service Integrated Pest Management Manual. *Identification, biology, management of silverfish, spiders, ticks.* Available at http://www1.nature.nps.gov/wv/ipm/tmanual.htm

St. Aubin, F. E., 1997. Chapter 20. Mites and ticks. Pp. 915-953. *In* Handbook of Pest Control, A. Mallis, ed. *Color and B&W photos, line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Stier *et al.*, 1999. Section 5: Indoor pest management. *In* Wisconsin's School Integrated Pest Management Manual. *Descriptions, management checklist.* Available at http://ipcm.wisc.edu/programs/school/default.htm

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Section 13. Rodents: Mice, Rats

		Points Available	Points Earned
Common Key Pests in Schools	1. **Priority:** Persons handling rodent traps or bait stations, or inspecting suspected harborages (e.g., crawl spaces, attics):		
	a) are trained in public health risks and proper hygiene; and	10	
	b) wear appropriate protective gear.	10	
	2. Traps, bait stations or other surfaces contaminated with rodent urine or feces are properly disinfected or disposed of.	10	
	3. **Priority:** Action thresholds for key rodent pests are defined in the IPM Plan and effectively implemented.	20	
	4. **Priority:** Rodenticides are used only by personnel fully trained in bait selection (coagulant vs. anticoagulants, blocks vs. pellets vs. grain-based, tracking powders, etc.) and use of tamper-resistant bait stations. *If rodents are managed effectively without rodenticides, score as N/A.*	20	
	5. When rodent problems occur, the problem rodent is identified correctly before taking action. Actions are appropriate for the problem rodent.	20	
	6. When rodent problems occur, contributing factors corrected (e.g., exclusion, sanitation, modify habitats, etc.).	20	
	7. **Bonus:** Traps used for rodent monitoring or management are checked daily and any trapped rodents still alive are disposed of in a humane manner. *If rodents are managed effectively without traps, score as N/A.*	*10*	
	8. Pest management roles communicated to maintenance and food preparation/serving staff at least annually include prompt reporting of rodent problems.	10	
	9. **Priority:** Snap traps, if used for rodents, are placed only in areas not accessible to children (e.g., locked storage rooms) or in locked, tamper-resistant containers securely attached to the floor, ground or wall so that the container cannot be picked up or moved. *If rodents are managed effectively without snap traps, score as N/A.*	20	
	10. Inspections for rodents include examining school grounds for food sources (e.g., edible plants, fallen fruit and nuts, animal feces) and stretches of dense vegetation or tall ground cover that allow rodents to travel long distance under cover. If signs of rodent feeding or activity are found, these conditions are corrected.	10	
	11. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for rodent management.	5	
	12. **Bonus:** Pest Manager can identify rodents common to the region on sight (e.g., Deer, House, White-Footed Mice; Norway, Black, Roof Rats).	*10*	

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13. **Bonus:** Teachers incorporate IPM for rodents into curricula and/or class projects.	*10*	_____
14. Least-Risk Options are the only methods used for rodent management.	5	_____
Total Points Available for Rodent Management	**160**	
Total Points Not Applicable	____	
Total Points Earned for Rodent Management		_____

Resources for Rodent Management:

Corrigan, R. M., 1997. Chapter 1. Rats and mice. Pp. 11-105. *In* Handbook of Pest Control, A. Mallis, ed. *B&W photos, line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Daar *et al.*, 1997. Chapter 5. IPM for rats and mice in schools. Pp. 87-102. *In* IPM for Schools: A How-to Manual. *Line drawings, identification, biology, communication, monitoring, management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Koehler *et al.*, 1999. School IPM Web Site. University of Florida. *Line drawings, identification, biology, monitoring, technical information on non-pesticidal products for rodent management.* Available at http://www.ifas.ufl.edu/~schoolipm/

Pinto, L., 1998. Rats. *In* The National Park Service Integrated Pest Management Manual, T. Cacek, ed. *Identification, biology, management.* Available at http://www1.nature.nps.gov/wv/ipm/rats.htm

Smith, E.H. and R.C. Whitman, 1999. NMPA Field Guide to Structural Pests. 800 pp. *Color photos, identification, biology, management for 6 rodent species.* Available from National Pest Management Association Inc., 8100 Oak Street, Dunn Loring VA 22027. (703) 573-8330, FAX (703) 573-4116. Web site http://www.pestworld.org/homeowners/resource-center/field_guide/field_guide.html

Stauffer *et al.*, 1998. Rodents. Pp. 4-10 to 4-16. *In* IPM Workbook for New York State Schools. *Identification, biology, monitoring, management.* Available at http://www.nysaes.cornell.edu/ipmnet/ny/urban/workbook_final.pdf

Stier *et al.*, 1999. Section 5: Indoor pest management. *In* Wisconsin's School Integrated Pest Management Manual. *Descriptions, monitoring, management.* Available at http://ipcm.wisc.edu/programs/school/default.htm

Rodent Facts and Figures

- A mouse produces between 40 to 100 droppings per day.
- A rat produces between 20 to 50 droppings and ½ ounce of urine per day.
- Rats and mice spend about ½ hour each day gnawing on objects.
- Diseases spread by rodents have killed more than 10 million people over the last 100 years, but this number is declining dramatically due to advances in sanitation, antibiotics and rodent pest management.
- Pest management professionals are a high-risk group for hantavirus, a respiratory illness with a high mortality rate. Several species of rodents act as reservoirs for the disease and special precautions are advised when handling rodents or working in areas previously or currently infested with rodents.
- Rodents benefit humankind by feeding on other pests, including cockroaches; serving as laboratory research animals; and providing a source of food for wild animals, birds and even humans in many cultures throughout the world.

- Source: Corrigan, 1997.

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Common Key Pests in Schools

Section 14. Stinging Insects: Ants, Bees, Wasps

		Points Available	Points Earned
1.	**Priority:** Stinging insect nests that can be disturbed by children are destroyed.	20	
2.	Any nest destruction, treatment or removal is conducted when children are not present and by a licensed professional wearing appropriate protective equipment. Gasoline, oil or other materials not labeled for this use are not used.	20	
3.	**Priority:** Action thresholds for key stinging insect pests are defined in the IPM Plan and effectively implemented.	20	
4.	When stinging insect problems occur, the problem pest is identified before taking action. Actions are appropriate for the problem pest.	20	
5.	When stinging insect problems occur, contributing factors are identified and corrected (e.g., seal cracks or crevices, repair screens, resolve sanitation problems, remove nests).	20	
6.	Monitoring and inspection for stinging insects (e.g., yellowjackets) begins early in the season and actions are taken as soon as predetermined action thresholds are exceeded to prevent buildup of stinging insect populations.	10	
7.	Pest management roles assigned and communicated at least annually to school staff include prompt reporting all stinging insect nests sited on school grounds.	10	
8.	If traps are used for stinging insect management, traps are placed out of reach of children and are in place only during times of the year when stinging insects are present. Reusable traps are cleaned before end-of-season storage. *If stinging insects are managed effectively without traps, score as N/A.*	10	
9.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for stinging insect management.	5	
10.	At the start of each yellowjacket season, school staff are informed about stinging insect management including safety, how to obtain first aid, reporting and sanitation.	10	
11.	Plants attractive to yellowjackets (e.g., fruiting trees and shrubs) are not planted near school entrances or are removed and replaced with non-attractive plants.	5	
12.	Outdoor consumption of food or drinks attractive to yellowjackets is not permitted during yellowjacket season.	5	
13.	Trash and recycling cans on school grounds have spring-loaded door access to restrict yellowjacket access.	5	
14.	Cans are emptied frequently to prevent accumulated trash from blocking door closure.	5	

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15. Dumpsters and adjacent areas are maintained in clean condition.	5	_____
16. Problem honeybee nests are physically removed from buildings or school grounds without use of pesticides by a professional apiculturist. *If problem nests have not occurred, score as N/A.*	5	_____
17. After removal of nests from buildings, structural modifications (e.g., cracks are filled, damaged wood is replaced, wall voids are filled) are made to prevent reinfestation. *If problem nests have not occurred, score as N/A.*	5	_____
18. **Bonus:** Pest Manager can identify common stinging and related non-stinging insects and nests on sight (e.g., Velvet Ant, Fire Ant; Bumble Bee, Carpenter Bee, Honey Bee; Bald-Faced Hornet, Mud-Dauber Wasp, Paper Wasp, Yellowjacket).	*10*	_____
19. **Bonus:** Teachers incorporate IPM for stinging insects into curricula and/or class projects.	*10*	_____
20. Least-Risk Options are the only methods used for stinging insect management.	5	_____
Total Points Available for Stinging Insect Management	**185**	
Total Points Not Applicable		____
Total Points Earned for Stinging Insect Management		_____

Resources for Stinging Insect Management:

Alen-Wardell, G., 1998. Yellowjackets. *In* The National Park Service Integrated Pest Management Manual, T. Cacek, ed. *Line drawings, identification, biology, management.* Available at http://www1.nature.nps.gov/wv/ipm/yellowja.htm

Daar *et al.*, 1997. Chapter 19. IPM for yellowjackets and hornets in schools. Pp. 145-152. *In* IPM for Schools: A How-to Manual. *Line drawings, identification, communication, monitoring, management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Flint, M.L., ed., 2000. Pests of Home and Landscape. University of California Statewide IPM Project. *Color images, description, biology and management.* Available at http://www.ipm.ucdavis.edu/PMG/selectnewpest.home.html

Koehler *et al.*, 1999. School IPM Web Site. University of Florida. *Downloadable presentation (html, Acrobat, or Powerpoint) on fire ant IPM, technical information on non-pesticidal products for stinging insect management.* Available at http://www.ifas.ufl.edu/~schoolipm/

Pinto, L., 1998. Fire ants. *In* The National Park Service Integrated Pest Management Manual, T. Cacek, ed. *Line drawings, identification, biology, management.* Available at http://www1.nature.nps.gov/wv/ipm/fireants.htm

Stauffer *et al.*, 1998. Bees and wasps. Pp. 4-17 to 4-20. *In* IPM Workbook for New York State Schools. *Biology, identification, monitoring, management.* Available at http://www.nysaes.cornell.edu/ipmnet/ny/urban/workbook_final.pdf

Stier *et al.*, 1999. Section 3: Outdoor insect and disease management. *In* Wisconsin's School Integrated Pest Management Manual. *Descriptions, monitoring, management.* Available at http://ipcm.wisc.edu/programs/school/default.htm

Wegner, G.S., 1997. Chapter 13. Bees and wasps. Pp. 591-632. *In* Handbook of Pest Control, A. Mallis, ed. *Color, B&W photos, line drawings, identification keys, biology, management.* Available from GIE Media, (800) 456-0707.

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Section 15. Stored Product Pests: Moths, Beetles

[ ] NOT APPLICABLE (*Check here if these pests are not a problem requiring action in your school and proceed to the next section.)*

		Points Available	Points Earned
1.	**Priority:** Comprehensive building inspections include examining carpets; stored food, fabric and leather goods; insect, bird and animal specimens; closets, cabinets and other storage areas; and other potential food sources and harborages.	20	
2.	When stored product pest problems occur, the problem pest is identified before taking action. Actions are appropriate for the problem pest.	20	
3.	When problems occur, contributing factors are corrected (e.g., modify storage, remove and disposed of unneeded stored products, etc.).	20	
4.	Incoming shipments of dried fruit, flour, nuts, grains, bird or animal specimens or other products at high risk are inspected for signs of infestation on delivery. Infested products are returned to the shipper.	10	
5.	Carpets, fabrics and leather goods are thoroughly inspected and cleaned before storage and stored in moth and beetle-proof packaging if possible. If pest-proof storage is not possible, stored items are re-inspected and shaken, brushed or aired out at least twice annually. Stored bird and animal specimens are carefully inspected before storage.	10	
6.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for stored product pest management.	5	
7.	Stored dried fruit, vegetables, flour, grains, cereals, nuts, bird seed, pet food and other susceptible foods are refrigerated or stored in tightly sealed metal or glass containers with rubber seals on lids.	10	
8.	Communications to teachers include proper storage of these materials (listed in #7 above) if used and stored in classrooms.	5	
9.	**Bonus:** Pest Manager can identify major stored product pests common to the region on sight (e.g., Angoumois Grain Moth, Casemaking Clothes Moth, Indian Meal Moth, Mediterranean Flour Moth, Webbing Clothes Moth; Black Carpet Beetle, Black Larder Beetle, Common Carpet Beetle, Drugstore Beetle, Flour Beetles, Hide Beetle, Larder Beetle, Varied Carpet Beetle, Warehouse Beetle).	*10*	
10.	**Bonus:** Teachers incorporate IPM for stored product pests into curricula and/or class projects.	*10*	
11.	Least-Risk Options are the only methods used for management of stored product pests.	5	
	Total Points Available for Stored Product Pest Management	**105**	
	Total Points Earned for Stored Product Pest Management		

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Resources for Stored Product Pest Management:

Daar *et al.*, 1997. Chapter 7. IPM for clothes moths and carpet beetles in schools. Pp. 49-55. *In* IPM for Schools: A How-to Manual. *Line drawings, identification, monitoring, management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Flint, M.L., ed., 2000. Pests of Home and Landscape. University of California Statewide IPM Project. *Color images, description, biology and management.* Available at http://www.ipm.ucdavis.edu/PMG/selectnewpest.home.html

Granovsky, T. A., 1997. Chapter 14. Stored product pests. Pp. 635-728. *In* Handbook of Pest Control, A. Mallis, ed. *Color and B&W photos, line drawings, identification key, biology, management.* Available from GIE Media, (800) 456-0707.

Hedges, S.A. and M.L. Lacey, 1996. Field Guide for the Management of Structure-Infesting Beetles. Volume I. Hide and Carpet Beetles/Wood-Boring Beetles. 196 pp. *Color and B&W photos, line drawings, identification keys, biology, management.* Available from GIE Media, (800) 456-0707.

Hedges, S. A. and M.L. Lacey, 1996. Field Guide for the Management of Structure-Infesting Beetles. Volume II. Stored Product Beetles/Occasional & Overwintering Beetles. 212 pp. *Color and B&W photos, line drawings, identification keys, biology, management.* Available from GIE Media, (800) 456-0707.

Hinderer, C. L., 1997. Chapter 11. Hide & carpet beetles. Pp. 465-500. *In* Handbook of Pest Control, A. Mallis, ed. *B&W photos, line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Katz, H. L., 1997. Chapter 10. Clothes moths. Pp. 427-462. *In* Handbook of Pest Control, A. Mallis, ed. *B&W photos, line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Koehler *et al.*, 1999. School IPM Web Site. University of Florida. *Downloadable presentation (html, Acrobat, or Powerpoint) on fire ant IPM, technical information on non-pesticidal products for stored product pest management.* Available at http://www.ifas.ufl.edu/~schoolipm/

Smith, E.H. and R.C. Whitman, 1999. NMPA Field Guide to Structural Pests. 800 pp. *Color photos, identification, biology, management for more than 36 stored product pest species.* Available from National Pest Management Association Inc., 8100 Oak Street, Dunn Loring VA 22027. (703) 573-8330, FAX (703) 573-4116, Web site http://www.pestworld.org/homeowners/resource-center/field_guide/field_guide.html

Stier *et al.*, 1999. Section 5: Indoor pest management. *In* Wisconsin's School Integrated Pest Management Manual. *Food pest color photos, monitoring, management.* Available at http://ipcm.wisc.edu/programs/school/default.htm

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Section 16. Wood-Damaging Pests: Carpenter Ants and Bees, Fungi, Termites, Wood-Boring Beetles

[ ] NOT APPLICABLE (*Check here if wood-damaging pests are not a problem requiring action in your school and proceed to the next section.*)

		Points Available	Points Earned
1.	Wood structural components of buildings are inspected on a regular basis for wood-damaging pests and damage by qualified professionals such as contracted or in-house maintenance or pest management professionals. Inspection intervals (e.g., annual, semi-annual) are appropriate to the region, building age and condition, history of problems, etc.	20	_____
2.	**Priority:** Action thresholds for key wood-damaging pests are defined in the IPM Plan and effectively implemented.	20	_____
3.	When wood-damaging pest problems occur, the problem pest is identified before taking action. Actions are appropriate for the problem pest.	20	_____
4.	When problems occur, contributing factors are corrected (e.g., modify storage, remove and disposed of unneeded stored products, etc.).	20	_____
5.	A communications/training program is in place to personnel responsible for building structural maintenance to recognize wood-damaging pests and damaged wood.	10	_____
6.	Tree stumps, firewood piles or leftover scraps of wood from construction are removed to a distance of at least 10 feet from any foundation. Wood debris is not buried on school grounds. Stored wood and wood products are not permitted to contact soil.	10	_____
7.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for wood-damaging pest management.	5	_____
8.	Building "skins" or outer surfaces are maintained in good repair and sealed using paint, putty and caulk. Cracks in foundations are patched promptly.	10	_____
9.	Wood, wooden furniture and other wooden objects are carefully inspected for beetle infestation and rots before use in buildings. Infested items are treated or discarded.	5	_____
10.	Kiln-dried wood is used in all construction projects.	5	_____
11.	Alternatives to wood (aluminum, concrete, steel, vinyl) are used for moisture-prone areas of new or renovated buildings where practical.	5	_____
12.	**Bonus:** Pest Manager can identify wood-damaging pests common to the region on sight (e.g., Carpenter Ants vs. termites).	*10*	_____
13.	**Bonus:** Teachers incorporate IPM for wood-damaging pests into curricula and/or class projects.	*10*	_____
14.	Least-Risk Options are the only methods used for wood-damaging pest management.	5	_____

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Total Points Available for Wood-Damaging Pest Management 135

Total Points Not Applicable ____ _____

Total Points Earned for Wood-Damaging Pest Management

Resources for Wood-Damaging Pest Management:

Daar *et al.*, 1997. Chapter 5. IPM for ants in schools. Pp. 27-34. *In* IPM for Schools: A How-to Manual. *Line drawings, identification, communication, monitoring, management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Flint, M.L., ed., 2000. Pests of Home and Landscape. University of California Statewide IPM Project. *Color images, description, biology and management.* Available at http://www.ipm.ucdavis.edu/PMG/selectnewpest.home.html

Hedges, S. A., 1997. Chapter 12. Ants. Pp. 503-589. *In* Handbook of Pest Control, A. Mallis, ed. *Color and B&W photos, line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Hedges, S.A. and M.L. Lacey, 1996. Field Guide for the Management of Structure-Infesting Beetles. Volume I. Hide and Carpet Beetles/Wood-Boring Beetles. 196 pp. *Color and B&W photos, line drawings, identification keys, biology, management.* Available from GIE Media, (800) 456-0707.

Koehler *et al.*, 1999. School IPM Web Site. University of Florida. *Information on selecting and using baits for termite management.* Available at http://www.ifas.ufl.edu/~schoolipm/

Kramer, R. D., 1997. Chapter 8. Wood-boring beetles. Pp. 357-391. *In* Handbook of Pest Control, A. Mallis, ed. *B&W photos, line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Potter, M. F., 1997. Chapter 6. Termites. Pp. 233-332. *In* Handbook of Pest Control, A. Mallis, ed. *Color and B&W photos, line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Rambo, G. W., 1997. Chapter 17. Fungi: molds, mildews and rots. Pp. 335-355. *In* Handbook of Pest Control, A. Mallis, ed. *B&W photos, line drawings, identification, biology, management.* Available from GIE Media, (800) 456-0707.

Smith, E.H. and R.C. Whitman, 1999. NMPA Field Guide to Structural Pests. 800 pp. *Color photos, identification, biology, management for 24 termite, ant and wood-damaging fungi species.* Available from National Pest Management Association Inc., 8100 Oak Street, Dunn Loring VA 22027. (703) 573-8330, FAX (703) 573-4116. Web site http://www.pestworld.org/homeowners/resource-center/field_guide/field_guide.html

Stauffer *et al.*, 1998. Ants. Pp. 4-21 to 4-27. *In* IPM Workbook for New York State Schools. *Biology, identification, monitoring, management.* Available at http://www.nysaes.cornell.edu/ipmnet/ny/urban/workbook_final.pdf

There was an old woman who swallowed a fly...

During an inspection of a school facility, occupants mentioned problems with flies. The inspector found Green Bottle Flies caught on glue boards behind a water fountain.

Next to the flies on the glue boards were several expired mice. Green Bottle Flies lay their eggs in the carcasses of dead animals, and had been attracted by the unfortunate rodents.

Further inspection revealed that the mice were entering the building through a hole in the bottom of a wooden doorway. The hole was the result of wood-damaging fungi invading the wooden sill.

It was raining at the time of the inspection, and water was pouring out a hole in a downspout, and splashing onto the steps and up onto the door sill.

The failure to inspect and maintain the drain pipe was thus responsible for the wet wood, which invited wood-rotting fungi, which softened the wood, which let the mice gnaw the hole in the door sill, that let in the mice that died on the glue board and attracted the flies, that caught the attention of the school's occupants...

- Courtesy of Don Rivard, Rivard's Resources: IPM, Waltham MA

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IPM Scorecard for School Buildings

Enter points earned for each category in Column D. If sections or practices within a section were not applicable to your school, enter the total points available for that section in Column C. Sum all columns. A 70% overall score is required for certification.

A. Module/Section	B. Total Points Available	C. Points Not Applicable	D. Points Earned
1. MODULE ONE: IPM Foundation Practices	**290**		
2. MODULE TWO: IPM Framework Practices	**285**		
3. MODULE THREE: Administrative and Policy Practices	**605**		
4. Ants	**105**		
5. Birds	**125**		
6. Cockroaches	**115**		
7. Fleas	**60**		
8. Flies, Gnats & Midges	**145**		
9. Head Lice	**110**		
10. Microbial Pests	**115**		
11. Mosquitoes	**105**		
12. Occasional Invaders	**80**		
13. Rodents	**160**		
14. Stinging Insects	**185**		
15. Stored Product Pests	**105**		
16. Wood-Damaging Pests	**135**		
I. Sum of each column	**2725**		
II. Total Adjusted Points Available (sum of Column B – sum of Column C)		XX	XX
III. Percent Score (Divide sum of Column D by Points in Line II):		XX	XX

Where do you stand along the IPM Continuum?

Score:

0% **25%** **50%** **75%** **100%**

Entry Level IPM **IPM Achiever** **IPM Excellence**

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Part II. IPM Standards for School Grounds

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MODULE ONE: IPM FOUNDATION for School Grounds

Section 1. IPM Planning and Communication	Points Available	Points Earned
1. Appropriate personnel (e.g., superintendent, facilities manager, principal, *IPM Coordinator*) understand and ensure that school meets all Federal, State and local legal requirements related to *pest* management on school grounds (e.g., posting, notification, pesticide management, etc.). ***Legal requirements that exceed or conflict with practices in these Standards supercede those listed here.***	20	
2. Resources are identified and acquired to assist in developing and implementing IPM (e.g., state/county Extension personnel, publications and on-line resources; non-governmental organizations, pest management professionals with expertise in school IPM).	20	
3. A written *IPM policy* is adopted which:		
a. states a commitment to IPM implementation;	5	
b. identifies overall objectives relating to pest and pesticide risk management;	5	
c. is used to guide decision-making; and	5	
d. is reviewed at least once every three years and revised as needed.	5	
4. An *IPM Committee* is formed to create and maintain the IPM policy, provide guidance in interpreting the policy and provide oversight of the program.	20	
5. An *IPM Coordinator* is designated to provide day-to-day oversight of IPM implementation.	20	
6. A plan is developed and implemented to provide necessary IPM training for the IPM Coordinator.	20	
7. *Pest Manager* is aware of and has access to resources to identify key pests.	20	
8. A pesticide notification policy is implemented such that:		
a. At least 24 hours prior to pesticide application, postings are placed in a designated public area detailing locations to be treated and contact information for further information *(exceptions may be made for applications made for emergencies, where an imminent threat to health exists (e.g., stinging insects), or for applications of* anti-microbials *and for pesticides defined as Least-Risk (Appendix A); for emergency applications, postings must be placed as soon as practical);*	10	
b. this notice remains posted for at least 48 hours after the application;	10	
c. copies of the pesticide label and MSDS sheet for the material(s) to be	10	

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used are available on request and maintained on file in a central location (e.g., main office); and

d. additional postings are placed on school grounds at the entry points of sites of pesticide applications in accordance with all laws. 10 _____

9. Complete, legible records of each pesticide application, including product, quantity used, date and time of application, location, application method and target pests are maintained for at least three years. 20 _____

10. Public access is provided on request to all information about the IPM policy, IPM plan and implementation. 20 _____

Section 2. Inspection, Sanitation and Exclusion

1. At least a preliminary review of school grounds is conducted to determine nature and extent of pest problems and contributing factors. This information is used to set IPM priorities. 20 _____

Section 3. Pest and Pesticide Risk Management

1. All pesticide applications are made by a person certified and/or licensed by the state to apply pesticides in commercial settings and treatment areas (e.g., turf). 20 _____

2. All pesticide applications are made only after detection of a verifiable pest problem and accurate identification of the pest. Applications are not made on a routine or regularly scheduled basis (e.g., weekly, monthly applications are not made). 20 _____

3. At least a preliminary review of pesticide use practices on school grounds is conducted to evaluate pesticide risks. This information is used to set priorities for reducing or replacing high-risk pesticides and use practices. 20 _____

Total MODULE ONE IPM Points Available 300

Total MODULE ONE Points Earned _____

About MODULE ONE and MODULE TWO IPM Practices

MODULE ONE and TWO practices are recommended for all school IPM programs, and represent an excellent starting point for new programs. These practices should be substantially completed before moving on. For certification, each MODULE ONE and TWO practice must be substantially completed (earn 80% or more of the points available for each practice). As you work through the Standards, be sure to note which practices need improvement.

For information on how to implement IPM practices, including model IPM policies, see the list on the pages following MODULE ONE.

For an explanation of unfamiliar terms, see the Glossary in Appendix B.

Completed MODULE ONE or MODULE TWO? See the IPM Institute Web site for an "IPM in Progress" Certificate, recognizing your accomplishment!

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Note items requiring additional action:

Evaluating Your Performance

Perfection is an ideal rarely accomplished in the real world. When evaluating your performance on IPM practices listed in these standards, use a critical eye to identify areas for improvement. Make a note of the action needed and score the practice accordingly. Remember, continuous improvement in reducing pests and pesticide risks is the goal, not a perfect score.

For certification purposes, Certified IPM Verifiers will also apply this perspective, working with you in a supportive manner to improve the effectiveness and efficiency of your IPM program.

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Resources for IPM Administration and Policy

All resource lists also available at www.ipminstitute.org, including active links!

IPM Planning and Communication

Browner, C., 1993. Pest Control in the School Enyironment. US Environmental Protection Agency, Washington D.C. 43 pp. *Model IPM policy statement.*

Daar *et al.*, 1997. Chapter 3. Setting injury and action thresholds, pp. 15-18; Appendix A. IPM-related curricula and resources for the classroom, pp. 157-158; Appendix B. How to develop an IPM program, pp. 159-167; Appendix C. Developing an IPM policy statement for school pest management, pp. 169-170; Appendix D. Integrated pest management (IPM) contract performance specifications, pp. 171- 175. *In* IPM for Schools: A How-to Manual. *Setting action thresholds; descriptions and contact information for IPM-related games, projects and curriculum guides; pest management roles; model IPM policy statement; model pest control service contract specifications.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Koehler *et al.*, 1999. School IPM Web Site. University of Florida. *Model IPM policy statement, pest control service contract specifications, pest sightings log and intent to apply pesticides notice; links to national and state resources for IPM in schools and IPM-related curricula resources.* Available at http://www.ifas.ufl.edu/~schoolipm/

Maryland Department of Agriculture. Action Thresholds in School IPM Programs. Pesticide Regulation Section, Annapolis, MD. 10 pp. Available at http://gnv.ifas.ufl.edu/~schoolipm/tp.htm

Merchant and Merchant, 1997. The ABC's of IPM Video Series: Module 1. An Introduction; Module 4. Bids and Contracts; Module 5. The Administrative Challenge. Available from Distribution and Supply Office, Texas Agricultural Extension Service, P.O. Box 1209, Bryan TX 77806-1209, (979) 845-6571, FAX (979) 862-1566.

Northwest Coalition for Alternatives to Pesticides, 1994. *Model IPM policy statement.* Available at http://www.pesticide.org/default.htm

New York State Office of General Services Procurement Services, 1998. OGS Integrated Pest Management RFP and Specifications. 27pp. *Model pest control service contract specifications.* Available at http://www.ogs.state.ny.us/purchase/snt/awardnotes/71010s940019spec.htm

Pennsylvania State University, 1999. IPM in Schools. *Model IPM policy statement.* Available at http://paipm.cas.psu.edu/schools/schoolIPM.html

Stauffer *et al.*, 1998. Chapter 3.0. Administration of an IPM program. Pp. 3-1 to 3-26 In IPM Workbook for New York State Schools. *IPM policy statements, roles, education and training, record keeping, notification, model bid specifications, model rating system for evaluating pest control bids.* Available at http://www.nysaes.cornell.edu/ipmnet/ny/urban/workbook_final.pdf

Stier *et al.*, 1999. Section 6: Pest Management Plan. *In* Wisconsin's School Integrated Pest Management Manual. *Model IPM policy, IPM plan, model reporting forms.* Available at http://ipcm.wisc.edu/programs/school/default.htm

Texas, State of, 1999. Integrated pest management in schools. Structural Pest Control Board. *Texas law and regulations, model IPM policy statement, model IPM bid specifications, most frequently asked questions regarding IPM, downloadable IPM forms and information.* Available at http://www.spcb.state.tx.us/ipm/ipmindex.htm

University of Florida Department of Entomology and Nematology, 2000. Best of the Bugs Web Site. *List of top web sites covering insects, mites and nematodes, including sites with teaching curricula.* http://www.ifas.ufl.edu/~entweb/uf-bob/

West Virginia Dept. of Agriculture, 1999. Integrated Pest Management in Schools and Other Public Institutions: Best Management Practices. *Model IPM policy, setting action thresholds, vendor evaluation criteria and contracts.* Available from the WV Dept. of Agriculture, 1900 Kanawha Boulevard E., Charleston WV 25305-0170.

Inspection, Sanitation and Exclusion

Daar *et al.*, 1997. Appendix E. Sample monitoring forms, pp. 177-194; Appendix F. How to collect and preserve specimens for identification, pp. 195-196; Appendix I. Inspection checklist for detecting structural decay and structural pest damage, pp. 209-213. *In* IPM for Schools: A How-to Manual. *Model monitoring forms for landscapes, model pest control trouble call log; collecting pest and plant specimens.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Smith-Fiola, D. ed., 2000. Landscape Integrated Pest Management: An Alternative Approach to Traditional Landscape Maintenance. Sixth Edition. 259 pp. *Basic and advanced monitoring methods, record keeping, site mapping, equipment.* Available from Publications Distribution Center, Cook College, Rutgers University, 57 Dudley Road, New Brunswick NJ 08901-8520. (732) 932-9762. Web site http://www.rce.rutgers.edu

Stier *et al.*, 1999. Section 1: Essential Standards of IPM. *In* Wisconsin's School Integrated Pest Management Manual. *Indoor/outdoor sanitation and exclusion checklists.* Available at http://ipcm.wisc.edu/programs/school/default.htm

"Regular plant inspections (every 2 to 4 weeks) are an essential way to keep track of changes in pest problems and plant health. Monitoring is close inspection of the plant from top to bottom, looking for both obvious and hidden signs and symptoms of pests and poor health.

This requires more knowledge on the part of the monitor: knowledge of plant identification; damage symptoms; insect and disease life cycles; population thresholds; as well as the advantages of various control measures.

Regular monitoring aids in preventing pest problems since potential infestations are discovered, before they become serious, when pests are small and damage is low. Noticeable damage can thus be prevented. Alternatives to traditional pesticides are also best used on smaller/immature pests."

- Excerpt from Smith-Fiola, 2000

Pest and Pesticide Risk Management

Bio-Integral Resource Center, 2000. Directory of Least-Toxic Pest Control Products. The IPM Practitioner 21: (11/12) 1-38. List of least-toxic controls by target pest, including insect, plant disease, weed and vertebrate pests; list of suppliers with contact information. Available from BIRC, PO Box 7414, Berkeley CA 94707. (510) 524-2567, FAX (510) 524-1758. E-mail: birc@igc.org

Braness, G., 1997. Chapter 23. Insecticides used in pest control. Pp. 1061-1101. *In* Handbook of Pest Control, A. Mallis, ed. *B&W photos, chemical classifications, mode of actions, formulations and table of insecticides with trade names, common names, US EPA signal word and uses.* Available from GIE Media, (800) 456-0707.

Brown, A. E., 1999. Pesticide Information Leaflet Series. University of Maryland. A series of 29 downloadable leaflets in PDF format including insect repellant safety, pesticide safe use checklist, protecting ground water, pesticides associated with skin diseases, reading pesticide labels, multiple chemical sensitivity, pesticides and cancer, pesticides and the endocrine system. Available at http://www.pest.umd.edu/spatc/Leaflets/LeafletList.html

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Daar *et al.*, 1997. Appendix G. Pesticide information resources. Pp. 197-198. In IPM for Schools: A How-to Manual. *Contact information for non-governmental sources of information on pesticides and pesticide risk management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

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Goldenberg, N., 1997. Chapter 27. Legislation, liability and litigation. Pp. 1249-1269. *In* Handbook of Pest Control, A. Mallis, ed. *Federal legislation relating to pesticides and pesticide risks, reducing liability, handling claims.* Available from GIE Media, (800) 456-0707.

National Pesticide Telecommunications Network. *Toll-free telephone service provides pesticide information, fact sheets on pesticides and anti-microbials.* (800) 858-7378. More at http://ace.orst.edu/info/nptn/index.html

Northwest Coalition for Alternatives to Pesticides, 1999. School Pesticide Use Reduction Program. *Fact sheets on pesticides and alternatives to pesticides, Journal of Pesticide Reform quarterly newsletter.* Available at http://www.pesticide.org/default.htm

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An AWESOME Search Engine for Plant and Pest Information:

One of the best places on the Web to search for information specific to your region!

The Ohio State University Factsheet Database and Search Engine locates on-line guides for answering plant-related questions from 46 different universities and government institutions across the United States and Canada. Over 20,000 pages of Extension fact sheets and bulletins provide a concentrated source of plant-related information. You can search these by region, to locate information most likely to be useful to you. Simply type in the name of a plant or pest, and a list of fact sheets appears in seconds!

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MODULE TWO: IPM FRAMEWORK for School Grounds

Section 1. IPM Planning and Communication	Points Available	Points Earned
1. Pest management roles are developed for and communicated at least annually to:		
a) administrators (e.g., principals regarding posting, notification, reporting, etc.);	5	
b) teachers (e.g., do not bring in/apply pesticides, sanitation, etc.);	5	
c) custodians (e.g., pest sightings log, inspection, sanitation, exclusion, etc.);	5	
d) food handlers (e.g., sanitation, exclusion, etc.); and	5	
e) outside contractors (e.g., IPM policy, posting, pest control options to outside pest, landscape and turf management professionals).	5	
2. Pest management roles are developed for and communicated at least on an as needed basis (e.g., head lice incident):		
a) students (e.g., reporting, sanitation, head lice prevention, etc.); and	5	
b) parents (e.g., no nit policy).	5	
3. A written *IPM Plan* is prepared that includes a schedule for inspection and monitoring of school grounds and schedule for areas requiring more frequent inspection/monitoring (e.g., athletic fields).	20	
4. If outside contractors provide pest control services, a written contract is signed identifying specific IPM practices to be used including regular inspections, monitoring where appropriate, record-keeping and agreement to abide by the IPM Policy and IPM Plan, including use of only Reduced-Risk or Least-Risk Options for schools pursuing certification. *If outside contractors are not used, score as N/A.*	20	
5. A Pest Sightings/Damage Log is kept in a designated area (e.g., main office). Turf and landscape maintenance staff, athletic department staff and others who supervise those using school grounds are instructed to report all pest-related incidents to the log including date, time, exact location, a description of the pest or pest damage and the name of the person reporting. Pest Manager reviews reports promptly, and records and dates responses taken to each report. *This log may be part of a general maintenance issue reporting system.*	20	
6. School notifies all students, staff and others requesting special consideration in the event of a pesticide application:		
a) school provides direct notification to those individuals at least 48 hours in advance of any pesticide application; and	10	

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b) school communicates that this notification option is available to parents and staff at least annually. 10 _____

Exceptions may be made where an imminent threat to health exists (e.g., stinging insects), or for applications of pesticides defined as Least-Risk (Appendix A), or for situations where the school grounds will be unoccupied for 72 hours. For emergency applications, postings must be placed as soon as practical.

7. Key staff (e.g., IPM Coordinator, Pest Manager, turf and landscape maintenance staff) participate in IPM training at least annually. Training is adequate and appropriate to the IPM roles fulfilled by these staff members. 20 _____

Section 2. Inspection, Sanitation and Exclusion

1. A comprehensive inspection of all school grounds is conducted by an in-house or contracted pest management professional for defects including cracks in walkways and driveways; food, moisture and shelter resources available to pests; moisture, pest or other damage to fences, retaining walls, irrigation and drainage systems, etc.; pest runways, pest fecal matter or other signs of pest activity; etc. A report of all defects is prepared and corrective actions are identified. 20 _____

2. Legible records are maintained of inspection results, including date, pests and/or pest damage found and location, estimate of pest density or damage level, recommendation, actions taken and evaluations of results. 20 _____

3. A timeline is established for completion of corrective actions and evaluation of results. 20 _____

Section 3. Pest and Pesticide Risk Management

1. Pesticide inventories are maintained only if personnel properly licensed to apply those pesticides are on staff. Storage is tightly controlled to prevent unauthorized access. *If pesticide inventories are not maintained by the school, score as N/A.* 20 _____

2. Baits (e.g., for rodents), if used, are:

   a) placed in areas inaccessible or off-limits to children; 5 _____

   b) placed in a locked, distinctively marked, tamper-resistant container designed specifically for holding baits and constructed of metal, plastic or wood; 5 _____

   c) used in bait containers securely attached to immovable objects such that the container cannot be picked up and moved; 5 _____

   d) placed in the baffle-protected feeding chamber of the bait container and not in the runway; 5 _____

   e) If used in wet areas, are parafinized or weatherproof ; and 5 _____

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f) not used outdoors unless bait containers are inaccessible to children (e.g., placed underground in pest nests or on building roofs). 5 _____

If pests are managed effectively without baits, score as N/A.

3. Reduced-Risk or Least-Risk Options are the only methods used. 20 _____

Total MODULE TWO IPM Points Available 265

Total Points Not Applicable ____

Total MODULE TWO Points Earned _____

Note items requiring additional action:

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MODULE THREE: Administrative & Policy Practices for School Grounds

Section 1. IPM Planning and Communication	Points Available	Points Earned
1. ***Priority***: The IPM Plan includes a list of key pests and action thresholds for each key pest (even if threshold is one, i.e., no tolerance).	20	_____
2. **Priority**: The IPM Plan includes a list of management options to be used when key pest problems occur and specifies lesser risk options (e.g., sanitation, exclusion) to be used before resorting to actions with greater risk factors. (See Appendix A for discussion on risk ranking.)	20	_____
3. The IPM Plan includes a list of actions to prevent and avoid key pest problems (e.g., replacement of problem plants, moving problem plants to more favorable locations, slope modification, pavement replacement and repair) and a timeline for implementation.	20	_____
4. If outside professional pest management or grounds maintenance contractors are used, bids are evaluated not only on the basis of cost but also on the contractor's:		
a) experience and performance history with an IPM approach;	5	_____
b) ability to conduct preventative inspections;	5	_____
e) ability to apply treatments after school hours; and	5	_____
f) demonstrated practice of using lowest risk control options first.	5	_____
If outside contractors are not used, score as N/A.		
5. The IPM Plan specifies preventative and avoidance strategies for grounds maintenance and new or renovated landscape design such as avoiding pest-prone plants, proper placement, etc.	10	_____
6. The IPM Plan divides turf and landscape areas by basic use level (i.e., athletic fields vs. lawns, highly visible vs. less visible landscape areas). Monitoring frequency and thresholds are appropriate to each level.	5	_____
7. The IPM Plan subdivides turf areas by advanced level of use (i.e., athletic fields with limited use for publicly attended events vs. athletic fields for daily practice and general use). Monitoring schedules and action thresholds are appropriate to each level.	5	_____
8. A complete inventory of all existing lawn maintenance equipment is maintained, as well as a list of desired equipment for reduced risk pest control options (e.g., aerator, de-thatcher, spring-tooth harrow, flotation tires, etc.). Desired equipment is worked into the budget over time.	10	_____
9. Grounds staff or Pest Manager reads an Extension newsletter/report of current pest information in season. *If not available, score as N/A.*	10	_____

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10. Information bulletins are distributed at least annually to inform staff, students, parents and others as appropriate about key IPM issues such as roles, reporting, sanitation, etc.	10	_____
11. School notifies staff and parents at least 48 hours in advance of the application of any pesticide not on the Least-Risk Pest Control Option List. Such notification may be incorporated in any notice being sent to staff or parents meeting the 48-hour advance timing. *Exceptions may be made for applications made for emergencies, where an imminent threat to health exists (e.g., stinging insects). For emergency applications, notification must be made as soon as practical.*	10	_____
12. ***Bonus:*** Teachers incorporate school grounds IPM or general IPM concepts into curricula and/or class projects.	*10*	_____

Section 2. Inspection, Exclusion and Sanitation

1. A written IPM inspection checklist or form is used for periodic inspections, listing each landscape feature (e.g., lawns, playing fields, walkways, driveways, etc.) to be inspected, including specific locations within features (e.g., retaining walls) to be covered in the inspection and specific conditions to be noted (e.g., repair, cleaning needs).	10	_____
2. Monitoring traps, plant phenology and/or growing degree days are used to predict pest activity and schedule monitoring activities.	5	_____
3. Pest management roles communicated to staff and students include proper disposal of food or food wrappers.	10	_____
4. Litter is collected and properly disposed of from school grounds at least weekly.	10	_____
5. **Bonus:** Food and beverages are allowed only in limited designated areas.	*10*	_____
6. Outdoor garbage containers and storage are placed away from building entrances.	10	_____
7. Outdoor garbage containers are emptied frequently to prevent accumulated trash from blocking door closure.	10	_____
8. Outdoor garbage containers, dumpsters, compactors and storage are placed on hard, cleanable surfaces.	10	_____
9. Outdoor garbage containers have spring-loaded lids to exclude pests.	10	_____
10. Outdoor garbage containers are washed on at least a monthly basis, including spill-contaminated areas around containers.	10	_____
11. Cracks and crevices in paved areas are corrected.	10	_____
12. Stored waste is collected and moved off site at least once weekly.	10	_____

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13. **Bonus:** Stored waste is collected and moved off site at least **twice weekly.**	*10*	_____
14. Recyclables are collected and moved off site at least weekly.	10	_____
15. **Bonus:** Recyclables are collected and moved off site at least **twice weekly.**	10	_____

Section 3. Pest and Pesticide Risk Management

1. **Priority:** When pest problems requiring action occur, appropriate lesser risk options are used first.	20	_____
2. **Priority:** All pesticide application equipment is calibrated at the start of each season. Records (date, calibrator, etc.) are maintained for 3 years.	10	_____
3. **Priority:** Pesticide and fertilizers are loaded into application equipment over a hard surface where spills can be promptly and thoroughly contained and cleaned without danger of spill leaching into soil or runoff into soil, drains or sewers.	10	_____
4. All pesticide application equipment is re-calibrated at mid-season.	10	_____
5. Pesticide applications are limited to affected areas, plants or plant parts rather than treating an entire management unit, group of plants or entire plant, respectively, as per monitoring results (e.g., one corner of a lawn is treated for grubs, or one shrub or portion of a shrub is treated).	10	_____
6. When effective control can be achieved at reduced rates, pesticide applications are made at less than the maximum labeled rate.	10	_____
7. Where appropriate (e.g., herbicide applications), a colorant is used to mark the treated area.	10	_____
8. If baits or traps of any kind are used:		
a) a map or floor plan of each area where baits or traps are located is prepared;	5	_____
b) each bait station or trap is numbered and entered on the map;	5	_____
c) they are marked with appropriate warning language; and	5	_____
d) checked at least once per month.	5	_____
If pests are managed effectively without baits or traps, score as N/A.		
9. Inventory is managed to track current stock, use and ensure proper disposal of unused materials and empties. *If pesticide inventories are not maintained by the school, score as N/A.*	10	_____
10. **Bonus:** Least-Risk Options are the only pest controls used.	*10*	_____

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11. **Bonus:** No pesticides are stored on school grounds.	*10*	_____
12. **Bonus:** Action thresholds for pesticide applications correspond with pest pressure sufficient to cause physiological injury, not aesthetic injury.	*10*	_____
13. **Bonus:** Teachers incorporate pest and pesticide risk management into curricula and/or class projects.	*10*	_____
Total MODULE THREE Administration and Policy IPM Points Available	**375**	
Total Points Not Applicable		____
Total MODULE THREE Administration and Policy IPM Points Earned		_____

Note items requiring additional action:

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About MODULE THREE IPM Practices

Not all MODULE THREE IPM practices are appropriate for all schools. Choose the ones that will be most effective for your IPM program. For certification, you must implement enough practices to earn an overall 70% score for all three modules, including applicable pest-specific sections. Most schools will need to complete just a few of the pest-specific sections.

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Note items requiring additional action (continued):

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MODULE THREE: Plant and Pest-Specific IPM Practices for School Grounds

Section 4. Landscape Plant Cultural Management

[ ] NOT APPLICABLE (*Check here if landscape plants requiring management are not present on your school grounds and proceed to Section 35, Turf Management)*

		Points Available	Points Earned
1.	At least a rough landscape plant map is prepared:		
	a) noting locations of trees, shrubs and ornamentals;	5	
	b) dividing the landscape into management units; and	5	
	c) copies of the map are updated annually, noting soil fertility tests, pest problems and key plants.	10	
2.	Landscape plants are scouted at least monthly during the growing season for conditions requiring action (e.g., damaged, diseased, dead limbs; soil erosion/compaction; insect, disease, weed pests and damage).	20	
3.	Scouting follows a regular pattern to ensure all plantings are checked.	10	
4.	Corrective actions are identified and a timeline is established for implementation.	10	
5.	Scouting results, corrective actions and evaluations of results are noted legibly in writing and these records are maintained for at least three years.	10	
6.	Soil in landscape plantings is tested at least every five years for nitrogen, phosphorus, potassium and pH.	10	
7.	Fertilizers and other soil amendments are applied according to soil and/or plant foliage test results, not on a routine or regularly scheduled basis.	10	
8.	Identifying soil compaction is part of regular monitoring and problem areas are corrected.	10	
9.	Irrigation of established plants is scheduled according to need and anticipated weather, not on a routine or regularly scheduled basis. *If soil moisture is managed effectively without irrigation, score as N/A.*	10	
10.	*Key plants* in the landscape are scouted more frequently during critical times of year (i.e., around key pest emergence, egglaying, etc.).	10	
11.	Signs of erosion are minimal.	5	
12.	When renovating, adding new plants or establishing new landscape areas, plant species are selected to address site-specific growing conditions (e.g., tolerance to key pests, pH levels, soil type, light levels, hardiness zone, annual rainfall, etc.).	5	
13.	Plant spacing is adequate to ensure sufficient light, nutrients and water.	5	

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14. When renovating, changes in grade or drainage around established trees are avoided unless necessary to correct an existing problem.	5	_____
15. In temperate areas, fertilizers are not applied after mid-summer or before complete dormancy to avoid delaying dormancy.	5	_____
16. Perennial beds are mulched to conserve soil moisture, improve organic matter, reduce compaction and moderate soil temperature.	10	_____
17. The root zones of trees and shrubs are mulched.	10	_____
18. Mulch is prevented from contact with buildings (≥12 inches away).	5	_____
19. Plant debris and leaves are not permitted to accumulate on paved areas (e.g., on sidewalks, parking areas, road and driveways) to avoid movement into sewer systems and surface water bodies.	10	_____
20. Fertilizer applications are split (e.g., one in spring and one in fall) rather than one single heavy application.	5	_____
21. When fertilizers are applied, they are watered into the soil to reduce wind or rain-induced movement from the site.	5	_____
22. When fertilizers are needed, slow-release forms of nitrogen are used.	5	_____
23. Irrigation is scheduled to minimize the amount of time leaves remain wet to reduce opportunities for disease development (i.e., plant foliage is dry before nightfall). *If soil moisture is managed effectively without irrigation, score as N/A.*	5	_____
24. Irrigation is allowed to drain before heavy foot or vehicle traffic is permitted in planted areas to minimize compaction. *If soil moisture is managed effectively without irrigation, score as N/A.*	5	_____
25. Drip irrigation is used for annual beds and/or high priority/demand beds. *If soil moisture is managed effectively without irrigation, score as N/A.*	5	_____
26. Key plants in the landscape are removed and replaced with plants less susceptible to pest problems.	5	_____
27. There are no visible signs of erosion on school grounds.	5	_____
28. **Bonus:** Pest Manager can identify the landscape plants present on school grounds.	*10*	_____
Total Points Available for Landscape Plant Cultural Management	**220**	
Total Points Not Applicable		____
Total Points Earned for Landscape Plant Cultural Management		_____

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Resources for Landscape Plant Cultural Management

Daar *et al.*, 1997. Chapter 16. IPM for trees and shrubs on school grounds. Pp. 117-119. *In* IPM for Schools: A How-to Manual. US EPA. *Landscape plant health care management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Fare, D., 1999. Chapter 3. Planting, establishment and pruning of woody ornamentals, pp. 3.1 to 3.29; and M. Albrecht, Chapter 4. IPM for flower gardens, pp. 4.1 to 4.6. *In* Integrated Pest Management of Landscapes, Vail and Croker, eds. University of Tennesee Agricultural Extension Service Publication No. PB1639. *Line drawings, plant selection and placement, pruning notes for more than 75 species; soil preparation for flowering plants, fertilization and mulching.* Available from Mail and Supply Office, University of Tennessee, Knoxville TN. (865) 974-7300, FAX (865) 974-2713.

Maynard, B.K., R.A. Casagrande, M. Gold, S. Livingston and S.H. Gordon, 1999. Sustainable Trees and Shrubs. 3rd Edition. *Selecting the right plants for the site; form, texture, growth habit, hardiness, handling, planting and maintenance; evaluative indexes.* Available from University of Rhode Island Cooperative Extension, 3 E. Alumni Ave., Kingston RI 02881. (401) 874-2900. Older edition available at http://www.uri.edu/research/sustland/spl1.html

Ohio State University, 2000. Plant Facts: Factsheet Database and University Search Engine. *Quick search engine for answering plant-related questions, accessing on-line fact sheets and guides from 46 different universities and government institutions across the United States and Canada. Contains over 20,000 pages of Extension fact sheets and bulletins covering cultural and pest issues.* Available at http://plantfacts.ohio-state.edu/

Smith-Fiola, D. ed., 2000. Landscape Integrated Pest Management: An Alternative Approach to Traditional Landscape Maintenance. Sixth Edition. 259 pp. *Proper management for prevention of insect and disease pest problems.* Available from Publications Distribution Center, Cook College, Rutgers University, 57 Dudley Road, New Brunswick, NJ 08901-8520. (732) 932-9762. Web site http://www.rce.rutgers.edu

Stier *et al.*, 1999. Section 2: Outdoor turf management. 40 pp. *In* Wisconsin's School Integrated Pest Management Manual. *Plant selection, key plants and pests, horticultural practices.* Available at http://ipcm.wisc.edu/programs/school/default.htm

Know Your Plants

"Before you can properly care for the trees and shrubs on your school grounds, you must know what they are. Make a map of the grounds and identify every tree and shrub. You should be able to answer the following questions:

- What kind of soil does the plant prefer?
- How much water does it need?
- When should it be fertilized?
- How should it be pruned?
- Does it prefer shade or sun?
- How much heat or cold can it tolerate?
- What are its most common pest problems?
- What environmental problems is it susceptible to (soil compaction, air pollution, salt damage, etc.)?"

- Excerpt from Daar et al. 1997

About Key Plants

"Key plants are those plants that provide aesthetic or functional attributes to the landscape's value or are more likely to suffer from serious, annual problems that will dominate your control practices. These are plants that will require more time and money to maintain. There are 10 groups of woody landscape plants that can be considered key plants: birch, crabapples, dogwoods, euonymus, junipers, maples, oaks, pines, flowering plums, and any plant in the rose family."

- Excerpt from Stier et al. *1999 (Note: Key plants and groups will vary by region.)*

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Landscape Plant Disease and Nematode Pests

Section 5. Canker Diseases

	Points Available	Points Earned
[ ] NOT APPLICABLE (*Check here if canker diseases are not a problem requiring action at your school and proceed to the next section.)*		
1. **Priority:** Action thresholds for problem canker diseases are defined in the IPM Plan and effectively implemented.	20	_____
2. When canker problems occur, the disease is identified correctly before taking action. Actions are appropriate for the disease.	20	_____
3. When canker problems occur, contributing factors are identified and corrected (e.g., avoid injury to bark, moderate fertilizer rates and use slow-release forms, irrigate to maintain vigor, prune out affected plant parts as soon as they appear, prune out any dead and dying branches on a regular basis, replace susceptible plants, sterilize pruning tools after use on affected plants).	20	_____
4. When canker disease problems occur on landscape trees, the affected tree is evaluated as a potential hazard and corrective action is taken as needed (e.g., bracing, pruning, removal).	20	_____
5. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for canker disease management.	10	_____
6. Landscape maintenance personnel are provided with training at least annually to recognize and report canker problems.	10	_____
7. **Bonus:** Pest Manager can identify on sight symptoms of problem canker diseases common to the region and to plants present on the school grounds (e.g., Black Knot, Botryosphaeria Canker, Cytospora Canker, Cypress Canker, Dogwood Canker, Foamy Canker, Phomopsis Canker, Pink Rot, Volutella Canker, Wetwood).	*10*	_____
8. Least-Risk Options are the only methods used for canker diseases.	5	_____
Total Points Available for Canker Disease Management	**105**	
Total Points Earned for Canker Disease Management		_____

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Section 6. Leafspots & Blights

[ ] NOT APPLICABLE *(Check here if leafspots and blights are not a problem requiring action at your school and proceed to the next section.)*

Common Key Pests on School Grounds

		Points Available	Points Earned
1.	**Priority:** Action thresholds for problem leafspots and blights are defined in the IPM Plan and effectively implemented.	20	
2.	When leafspot or blight problems occur, the disease is identified correctly before taking action. Actions are appropriate for the disease.	20	
3.	When leafspot and blight problems occur, contributing factors are identified and corrected (e.g., avoid overhead irrigation; prune out and destroy infected twigs during dormant months; reduce humidity around susceptible plants by proper weed management, spacing and pruning; remove infected leaves and destroy as soon as they are noticed; replace susceptible plants; schedule irrigation so that foliage dries quickly). For Fire Blight, remove infected twigs and branches during dry weather as soon as they appear and sterilize pruners between cuts.	20	
4.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for leafspot and blight management.	5	
5.	Landscape maintenance personnel are provided with training at least annually to recognize and report leafspot and blight problems.	10	
6.	**Bonus:** Pest Manager can identify on sight symptoms of problem leafspots and blights common to the region and to the plants present on the school grounds (e.g., Anthracnose, Apple Scab, Entomosporium Leaf Spot, Fire Blight, Gray Leaf Spot, Oak Twig Blight, Powdery Mildew, Schaeropsis Blight, Septoria Leaf Spot, Shothole).	*10*	
7.	Least-Risk Options are the only methods used for leafspots and blights.	5	
	Total Points Available for Leafspot and Blight Management	**80**	
	Total Points Earned for Leafspot and Blight Management		

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Section 7. Nematodes

[ ] NOT APPLICABLE (*Check here if nematodes are not a problem requiring action at your school and proceed to the next section.)*

		Points Available	Points Earned
1.	**Priority:** Action thresholds for problem nematodes are defined in the IPM Plan and effectively implemented.	20	_____
2.	When nematode problems are suspected, soil samples (or branch samples for Pinewood Nematode) are sent to a lab for identification. Actions are appropriate for the nematode.	20	_____
3.	When nematode problems occur, contributing factors are identified and corrected (e.g., avoid replanting susceptible plants into infested soil, buy and plant only nematode-free stock, clean tools and equipment after working in infested soil, do not allow irrigation water from infested soil to runoff onto clean soil, moderate fertilizer rates and use slow-release forms, increase soil organic matter, irrigate to maintain vigor, replace susceptible plants, use only fully composted or sterilized soil amendments when planting). For Pinewood Nematode, remove infected trees and destroy wood before nematodes and the Pine Sawyer vector disperses to healthy trees.	20	_____
4.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for nematode management.	5	_____
5.	Landscape maintenance personnel are provided with training at least annually to recognize and report nematode problems.	10	_____
6.	**Bonus:** Pest Manager can identify on sight symptoms of problem nematodes common to the region and to the plants present on the school grounds (e.g., Citrus, Dagger, Pin, Pinewood, Ring, Root Knot, Root Lesion, Stunt Nematodes).	*10*	_____
7.	Least-Risk Options are the only methods used for nematodes.	5	_____
	Total Points Available for Nematode Management	**80**	
	Total Points Earned for Nematode Management		_____

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Section 8. Root & Crown Diseases

[ ] NOT APPLICABLE *(Check here if root and crown diseases are not a problem requiring action at your school and proceed to the next section.)*

		Points Available	Points Earned
1.	**Priority:** Action thresholds for problem root and crown diseases are defined in the IPM Plan and effectively implemented.	20	
2.	When root or crown disease problems occur, the disease is identified correctly before taking action. Actions are appropriate for the disease.	20	
3.	When root and crown disease problems occur, contributing factors are identified and corrected (e.g., improve drainage, incorporate pine bark or other materials into poorly drained soils prior to planting, moderate irrigation rates, plant into raised beds in poorly drained areas, prevent mower/weed trimmer injury by replacing sod at base of plant with mulch, reduce compaction, replace susceptible plants).	20	
4.	When root and crown disease problems occur on landscape trees, the affected tree is evaluated as a potential hazard and corrective action is taken as needed (e.g., bracing, removal).	10	
5.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for root and crown disease management.	5	
6.	Landscape maintenance personnel are provided with training at least annually to recognize and report root and crown disease problems.	10	
7.	**Bonus:** Pest Manager can identify on sight symptoms of problem root and crown disease common to the region (e.g., Armillaria Root Rot; damping-off diseases; Phytophthora collar, foot, root and crown rots; Shoestring Root Rot).	*10*	
8.	Least-Risk Options are the only methods used for root and crown disease.	5	
	Total Points Available for Root and Crown Disease Management	**90**	
	Total Points Earned for Root and Crown Disease Management		

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Section 9. Rusts

[ ] NOT APPLICABLE *(Check here if rusts are not a problem requiring action at your school and proceed to the next section.)*

	Points Available	Points Earned
1. **Priority:** Action thresholds for problem rusts are defined in the IPM Plan and effectively implemented.	20	
2. When rust problems occur, the disease is identified correctly before taking action. Actions are appropriate for the disease.	20	
3. When rust problems occur, contributing factors are identified and corrected (e.g., avoid overhead watering, eliminate alternate hosts, prune out infected plant parts immediately, replace susceptible plants).	20	
4. When gall rust disease problems occur on landscape tree trunks or major limbs, the affected tree is evaluated as a potential hazard and corrective action is taken as needed (e.g., bracing, pruning, removal).	10	
5. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for rust management.	5	
6. Landscape maintenance personnel are provided with training at least annually to recognize and report rust problems.	10	
7. **Bonus:** Pest Manager can identify on sight symptoms of problem rusts common to the region and to plants on school grounds (e.g., Cedar-Apple Rust, Cedar-Hawthorne Rust, Gall Rusts, Red Pine Needle Rust, Western Gall Rust, White Pine Blister Rust).	*10*	
8. Least-Risk Options are the only methods used for rusts.	5	
Total Points Available for Rust Management	**90**	
Total Points Earned for Rust Management		

Section 10. Virus Diseases

[ ] NOT APPLICABLE *(Check here if virus diseases are not a problem requiring action at your school and proceed to the next section.)*

	Points Available	Points Earned
1. Action thresholds for problem virus diseases are defined in the IPM Plan and effectively implemented.	20	
2. When virus disease problems occur, contributing factors are identified and corrected (e.g., replace infected plants with certified virus-free stock, replace susceptible plants).	20	
3. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for virus disease management.	5	
4. Landscape maintenance personnel are provided with training at least annually to recognize and report virus disease problems.	10	
5. **Bonus:** Pest Manager can identify on sight symptoms of problem virus diseases common to the region and to the plants on school grounds (e.g., mosaic viruses, mottle viruses, ringspot viruses).	*10*	
6. Least-Risk Options are the only methods used for virus diseases.	5	
Total Points Available for Virus Disease Management	**60**	
Total Points Earned for Virus Disease Management		

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Section 11. Wilts

[ ] NOT APPLICABLE *(Check here if wilts are not a problem requiring action at your school and proceed to the next section.)*

		Points Available	Points Earned
1.	**Priority:** Action thresholds for problem wilts are defined in the IPM Plan and effectively implemented.	20	
2.	When wilt problems occur, the disease is identified correctly before taking action. Actions are appropriate for the disease.	20	
3.	When wilt problems occur, contributing factors are identified and corrected (e.g., avoid replanting susceptible plants into infected soil, moderate fertilizer rates and use slow-release forms, irrigate to maintain vigor, prune out affected plant parts as soon as they appear, replace susceptible plants, sterilize pruning tools after use on affected plants, use only fully composted or sterilized soil amendments when planting).	20	
4.	When wilt problems occur on landscape trees, the affected tree is evaluated as a potential hazard and corrective action is taken as needed (e.g., bracing, pruning, removal).	10	
5.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for wilt management.	5	
6.	Landscape maintenance personnel are provided with training at least annually to recognize and report wilt problems.	10	
7.	**Bonus:** Pest Manager can identify on sight symptoms of problem wilts common to the region and to the plants present on the school grounds (Fusarium Wilt, Verticillium Wilt).	*10*	
8.	Least-Risk Options are the only methods used for wilt.	5	
	Total Points Available for Wilt Management	**90**	
	Total Points Earned for Wilt Management		

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Section 12. Other Landscape Plant Disease Pests

[ ] NOT APPLICABLE *(Check here if there are no other landscape plant disease or nematode pests and proceed to the next section.)*

	Points Available	Points Earned
1. **Priority:** Action thresholds for these additional landscape diseases are defined in the IPM Plan and effectively implemented.	20	
2. When disease problems occur, the disease is identified correctly before taking action. Actions are appropriate for the disease.	20	
3. Contributing factors are identified and corrected. **List here:**	20	
4. When a pesticide is necessary, a spot application is limited to infested plants or plant parts instead of treating a group of plants or entire plant.	10	
5. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for landscape plant disease and nematode pest management.	5	
6. **Bonus:** Pest Manager can identify symptoms of these additional landscape diseases on sight. **List here:**	*10*	
7. Least-Risk Options are the only methods used for landscape plant disease and nematode pest management.	5	
Total Points Available for Other Landscape Disease & Nematode Pests	**80**	
Total Points Earned for Other Landscape Disease & Nematode Pests		

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Landscape Plant Insect & Mite Pests

Section 13. Bark, Trunk & Twig Borers

[ ] NOT APPLICABLE (*Check here if borers are not a problem requiring action at your school and proceed to the next section.)*

	Points Available	Points Earned
1. **Priority:** Action thresholds for key borer pests are defined in the IPM Plan and effectively implemented.	20	
2. When borer problems occur, the pest is identified correctly before taking action. Actions are appropriate for the pest.	20	
3. Inspection routines are appropriate to the problem pest (e.g., monitor the base of the trunk of *Prunus* varieties for cracked bark, frass and gumosis for Peachtree Borer in summer, monitor the crowns of elm trees for dieback and Elm Bark Beetles in May).	10	
4. When borer problems occur, contributing factors are identified and corrected (e.g., mulch around the base of dogwoods to prevent mower injury; correct drainage; irrigate near the outer portion of the canopy rather than near the trunk to avoid softening bark; prune out and destroy infested branches; remove freshly cut or fallen wood to avoid harboring borers; replace susceptible, stressed or dying plants).	20	
5. Actions are taken at the appropriate time for the specific pest and action (e.g., use degree days and/or pheromone traps to determine best time to monitor and manage clearwing borers, Nantucket Pine Tip Moth).	10	
6. When a pesticide is necessary, a spot application is limited to infested plants or plant parts instead of treating a group of plants or entire plant. (e.g., treat root crown for Peachtree Borer; treat tree trunks and not foliage for Southern Pine Beetle; treat terminals for Nantucket Pine Tip Moth, White Pine Weevil). *If borers are managed effectively without insecticides, score as N/A.*	10	
7. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for borer management.	5	
8. Landscape maintenance personnel are provided with training at least annually to recognize and report borer problems.	10	
9. **Bonus:** Pest Manager can identify problem borers common to the region on sight (e.g., Bronze Birch Borer, Cottonwood Borer, Dogwood Borer, Elm Bark Beetle, Flatheaded Apple Tree Borer, Lilac Borer, Locust Borer, Nantucket Pine Tip Moth, Peachtree Borer, Rhododendron Borer, Southern Pine Beetle, Twolined Chestnut Borer, White Pine Weevil, etc.).	*10*	
10. Least-Risk Options are the only methods used for borer management.	5	
Total Points Available for Bark, Trunk and Twig Borer Management	**110**	
Total Points Not Applicable		
Total Points Earned for Bark, Trunk and Twig Borer Management		

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Section 14. Caterpillars

[ ] NOT APPLICABLE *(Check here if caterpillars are not a problem requiring action at your school and proceed to the next section.)*

Common Key Pests on School Grounds

		Points Available	Points Earned
1.	**Priority:** Action thresholds for key caterpillar pests are defined in the IPM Plan and effectively implemented.	20	
2.	When caterpillar problems occur, the pest is identified correctly before taking action. Actions are appropriate for the pest.	20	
3.	When caterpillar problems occur, contributing factors are identified and corrected (e.g., avoid pesticides toxic to beneficials, replace susceptible plants).	20	
4.	Inspection routines are appropriate to the problem pest (e.g., monitor the bark of oak and other susceptible plants for Gypsy Moth egg masses in fall and winter; monitor foliage of ash, birch, fruit and nut trees and other susceptible plants for tent caterpillars and webbing tents in spring).	10	
5.	Action thresholds are appropriate to the problem species, plant age and growth stage (i.e., accept a higher level of defoliation in the summer vs. spring, or on established plants vs. young plants).	10	
6.	Actions are taken at the appropriate time (e.g., prune out and destroy tent caterpillar webbing and infested branches before substantial defoliation occurs; apply *Bacillus thuriengensis* to susceptible young caterpillars).	10	
7.	When a pesticide is necessary, a spot application is limited to infested plants or plant parts instead of treating a group of plants or entire plant. *If caterpillars are managed effectively without pesticides, score as N/A.*	10	
8.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for caterpillar management.	5	
9.	Landscape maintenance personnel are provided with training at least annually to recognize and report caterpillar problems.	10	
10.	**Bonus:** Pest Manager can identify problem caterpillars common to the region on sight (e.g., Azalea Caterpillars, Bagworms, Cankerworms, Eastern and Forest Tent Caterpillars, European Pine Shoot Moth, Fall Webworm, Fruittree Leafroller, Gypsy Moth, Omnivorous Looper, Orangestriped Oakworm, Poplar Tentmaker, Redhumped Caterpillar, Tussock Moth, Walnut Caterpillar, etc.).	*10*	
11.	Least-Risk Options are the only methods used for caterpillar management.	5	
	Total Points Available for Caterpillar Management	**120**	
	Total Points Not Applicable		
	Total Points Earned for Caterpillar Management		

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Section 15. Leaf Beetles & Weevils

[ ] NOT APPLICABLE *(Check here if Leaf Beetles and Weevils are not a problem requiring action at your school and proceed to the next section.)*

		Points Available	Points Earned
Common Key Pests on School Grounds			
	1. **Priority:** Action thresholds for key leaf beetle and weevil pests are defined in the IPM Plan and effectively implemented.	20	
	2. When leaf beetle or weevil problems occur, the pest is identified correctly before taking action. Actions are appropriate for the pest.	20	
	3. When leaf beetle and weevil problems occur, contributing factors are identified and corrected (e.g., replace susceptible plants).	20	
	4. Inspection routines are appropriate to the problem pest (e.g., monitor Black Vine Weevils with pitfall traps or burlap trunk bands, monitor leaves for notching, and/or monitor plants at night for feeding weevils; monitor growing terminals for eggs of Elm Leaf Beetles).	10	
	5. Action thresholds are appropriate to the problem species, plant age and growth stage (i.e., accept a higher level of defoliation in the summer vs. spring or on established plants vs. young plants).	10	
	6. Actions are taken at the appropriate time for the specific pest and action (e.g., apply parasitic nematodes for Black Vine Weevil only when weevil larvae or pupae are present).	10	
	7. When a pesticide is necessary, a spot application is limited to infested plants or plant parts instead of treating a group of plants or entire plant (e.g., apply insecticide in a band around the tree trunk above the reach of children for Elm Leaf Beetle). *If leaf beetles and weevils are managed effectively without pesticides, score as N/A.*	10	
	8. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for leaf beetle and weevil management.	5	
	9. Landscape maintenance personnel are provided with training at least annually to recognize and report leaf beetle and weevil problems.	10	
	10. **Bonus:** Pest Manager can identify problem leaf beetles and weevils common to the region on sight (e.g., Black Vine Weevil, Cottonwood Leaf Beetle, Elm Leaf Beetle, Japanese Beetle, Rose Chafer, Strawberry Root Weevil, Twobanded Japanese Weevil, etc.).	*10*	
	11. Least-Risk Options are the only methods used for leaf beetles and weevils.	5	
	Total Points Available for Leaf Beetle and Weevil Management	**120**	
	Total Points Not Applicable		
	Total Points Earned for Leaf Beetle and Weevil Management		

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Section 16. Sap-feeding Pests: Aphids, Adelgids, Lacebugs, Leafminers, Mealybugs, Mites, Psyllids, Scales, Spittlebugs, Thrips, Whiteflies

[ ] NOT APPLICABLE (*Check here if sap-feeding pests are not a problem requiring action at your school and proceed to the next section.)*

Common Key Pests on School Grounds

		Points Available	Points Earned
1.	**Priority:** Action thresholds for key sap-feeding pests are defined in the IPM Plan and effectively implemented.	20	
2.	When sap-feeding pest problems occur, the pest is identified correctly before taking action. Actions are appropriate for the pest.	20	
3.	When sap-feeding pest problems occur, contributing factors are identified and corrected (e.g., discontinue use of pesticides toxic to beneficials, exclude ants from plants, manage adjacent weed hosts, reduce fertilizer rates to moderate shoot growth, use slow-release forms of nitrogen fertilizer, replace susceptible plants with resistant plants, and/or reduce plant stress by mulching, relocating out of full sun or irrigating).	20	
4.	Inspection routines are appropriate to the problem pest (e.g., monitor hemlock twigs for Hemlock Wooly Adelgid eggsacs in spring and fall, monitor undersides of leaves for Twospotted Spider Mites and mite predators, monitor growing terminals for aphids and aphid predators).	10	
5.	Beneficials are also sampled, and insecticides, if used, are not applied if beneficials are present in sufficient numbers to provide control.	10	
6.	When a pesticide is necessary, a spot application is limited to infested plants or plant parts instead of treating a group of plants or entire plant. *If sap-feeding pests are managed effectively without pesticides, score as N/A.*	10	
7.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for sap-feeding pest management.	5	
8.	Landscape maintenance personnel are provided with training at least annually to recognize and report sap-feeding pest problems.	10	
9.	**Bonus:** Pest Manager can identify problem aphid, adelgid, mealybug and mites species and major predators and parasites common to the region on sight (e.g., Boxwood Psyllid, Eriophyid Mites, Euonymus Scale, Hemlock Wooly Adelgid, Longtailed Mealybug, Oystershell Scale, Pine Bark Adelgid, Privet Rust Mite, San Jose Scale, Southern Red Mite, Striped Mealybug, Twospotted Spider Mite, Wax Scale, White Pine Aphid, White Peach Scale, Wooly Apple Aphid, etc.)	*10*	
10.	Least-Risk Options are the only methods used for sap-feeding pest management.	5	
	Total Points Available for Sap-Feeding Pest Management	**110**	
	Total Points Not Applicable		
	Total Points Earned for Sap-Feeding Pest Management		

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Section 17. Sawflies

[ ] NOT APPLICABLE (*Check here if sawflies are not a problem requiring action at your school and proceed to the next section.*)

		Points Available	Points Earned
1.	**Priority:** Action thresholds for key sawfly pests are defined in the IPM Plan and effectively implemented.	20	
2.	When sawfly problems occur, the pest is identified correctly before taking action. Actions are appropriate for the pest.	20	
3.	When sawfly problems occur, contributing factors are identified and corrected (e.g., correct drainage, irrigate to relieve drought stress, replace susceptible plants).	20	
4.	Susceptible plants are visually inspected for problem sawflies (i.e., eggs, larvae or feeding damage) in the proper location at the appropriate time of year (e.g., monitor Eastern White Pine branches for defoliation and clusters of White Pine Sawfly larvae in spring and early fall, monitor roses in late spring for skeletonized leaves and the upper sides of those leaves for Rose Slug larvae, monitor oak tree crowns in summer for defoliation from oak sawflies).	10	
5.	Action thresholds are appropriate to the problem species, plant age and growth stage (i.e., accept a higher level of defoliation in the fall vs. spring, or on established plants vs. young plants).	10	
6.	When a pesticide is necessary, a spot application is limited to infested plants or plant parts instead of treating a group of plants or entire plant. *If sawflies are managed effectively without pesticides, score as NIA.*	10	
7.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for sawfly management.	5	
8.	Landscape maintenance personnel are provided with training at least annually to recognize and report sawfly problems.	10	
9.	**Bonus:** Pest Manager can identify problem sawflies common to the region on sight (e.g., Cyprus Sawfly, Dusky Birch Sawfly, Mountain-Ash Sawfly, Pin Oak Sawfly, Pearslug, Redheaded Pine Sawfly, Rose Slug, Slug Oak Sawfly, White Pine Sawfly, etc.).	*10*	
10.	Least-Risk Options are the only methods used for sawfly management.	5	
	Total Points Available for Sawfly Management	**110**	
	Total Points Not Applicable		
	Total Points Earned for Sawfly Management		

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Section 18. Other Landscape Plant Insect & Mite Pests

[ ] NOT APPLICABLE (*Check here if there are no other landscape plant insect or mite pests requiring action at your school and proceed to the next section.*)

	Points Available	Points Earned
1. Action thresholds for additional key landscape plant insect and mite pests are defined in the IPM Plan and effectively implemented.	20	
2. When problems occur, the pest is identified correctly before taking action. Actions are appropriate for the pest.	20	
3. Contributing factors are identified and corrected. **List here:**	20	
4. When a pesticide is necessary, a spot application is limited to infested plants or plant parts instead of treating a group of plants or entire plant. *If these pests are managed effectively without pesticides, score as N/A.*	10	
5. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for landscape plant insect and mite pest management.	5	
6. **Bonus:** Pest Manager can identify these additional landscape insect and mite pests and beneficial organisms on sight. **List here:**	*10*	
7. Least-Risk Options are the only methods used for landscape plant insect and mite management.	5	
Total Points Available for Other Landscape Insect or Mite Pest Mgt.	**80**	
Total Points Not Applicable		
Total Points Earned for Other Landscape Insect and Mite Pest Mgt.		

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Action Thresholds for Leaf-Feeding Insects

Suggested action thresholds for caterpillar or leaf beetle damage to healthy, mature deciduous landscape plants are approximately 20% defoliation in the spring, and 30% to 40% in the summer. In the fall, it is generally inappropriate to control these pests on deciduous plants, since the leaves will soon be shed.

Exceptions can include young plants, plants suffering from drought or other stresses, or specific pests. For example, even slight feeding damage from Black Vine Weevil adults can indicate a potential problem for young plants, due to root feeding from larvae concealed in the soil.

- Source: Dreistadt et al., *1994*

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Smith-Fiola, D. ed., 2000. Landscape Integrated Pest Management: An Alternative Approach to Traditional Landscape Maintenance. Sixth Edition. 259 pp. *Line drawings, identification key to pests and beneficials, IPM decision-making guidelines, pest appearance and management table, partial list of pest-resistant plants, common beneficial insects, insecticides and biologicals.* Available from Publications Distribution Center, Cook College, Rutgers University, 57 Dudley Road, New Brunswick NJ 08901-8520. (732) 932-9762. Web site http://www.rce.rutgers.edu

Turf Management

Section 19. Turf Cultural Management

[ ] NOT APPLICABLE (*Check here if turf is not present at your school and proceed to Section 53. Vertebrate Pests)*

	Points Available	Points Earned
1. At least a rough map is prepared:		
a) noting locations of turf areas;	5	
b) dividing these into management units/grids; and	5	
c) copies of map are updated annually noting soil tests, fertilizer applications and pest and other problems (e.g., erosion, compaction).	10	
2. High profile/high traffic turf areas are scouted **at least monthly** during the growing season for divots, bare areas, insect, disease and weed pests and damage, etc.	20	
3. **Bonus:** Turf is scouted **at least every other week** during the growing season.	*10*	
4. A serpentine or other regular pattern is used to ensure that all areas of the turf are covered.	10	
5. Problem turf areas identified in the IPM Plan are scouted more frequently during critical periods (i.e., around key pest emergence, egglaying, etc.).	5	
6. Corrective actions are identified and a timeline is established for implementation.	10	
7. Scouting results, corrective actions and evaluation of results are noted legibly in writing and these records are maintained for at least three years.	10	
8. Identifying soil compaction is part of regular monitoring and problem areas are corrected.	10	
9. Mowing height is set as high as practical to maximize shading and prevent weed growth and adjusted according to weather conditions, growth rate of the grass and the variety of turf.	10	
10. Any one mowing removes 1/3 or less of leaf tissue.	10	
11. Mower blades are kept sharp to ensure a clean cut.	10	
12. Grass clippings are generally not removed. If wet and clumpy, grass clippings are re-mowed or removed and composted.	10	
13. After mowing, grass clippings are removed from paved areas (e.g., sidewalks, parking areas, road and driveways) and composted or otherwise properly disposed of to avoid movement into sewer systems.	5	

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14. Thatch accumulation is monitored and corrected if excessive (> 1.25"). 10 _____

15. Soil is tested at least every five years for phosphorus, potassium and pH. 10 _____

16. Fertilizers and other soil amendments are applied according to soil and/or plant foliage test results, not on a routine or regularly scheduled basis (except for nitrogen, which may be applied on a scheduled basis). 10 _____

17. Fertilizers are applied several times (e.g., spring, summer, fall) rather than one single heavy application. 5 _____

18. When fertilizers are applied, they are watered into the soil to reduce wind or rain-induced movement from the site. 5 _____

19. When fertilizers are needed, at least 35% of the total annual nitrogen is in slow-release form to reduce pest flareups due to flushes of nitrogen. 5 _____

20. **Bonus:** Fertilizers are selected to include those that may promote thatch decomposition (e.g., composted organic materials). 5 _____

If turf moisture requirements are managed effectively without irrigation, score items 19-21 as N/A.

21. Irrigation is scheduled according to need and anticipated weather, not on a routine or regularly scheduled basis. Athletic fields may be irrigated on a scheduled basis that is adjusted for rainfall to ensure adequate moisture for recovery and growth. 10 _____

22. When irrigation is applied, it is sufficient to wet the entire turf root zone to reduce shallow rooting, but may be split to allow infiltration and avoid runoff. Exceptions are made for specific disease pressure (e.g., summer patch) dictating more frequent and less deep irrigations. 5 _____

23. If moisture-dependent turf diseases are a problem (e.g., pythium, rhizoctonia blight, rusts), irrigation is scheduled to minimize the amount of time grass blades remain wet to reduce opportunities for disease development (i.e., turf is dry before nightfall). 5 _____

24. Bare soil patches in turf areas are addressed promptly by correcting the underlying cause (e.g., excessive traffic, inappropriate seed mix, poor drainage) before reseeding. 5 _____

25. When renovating, planting new turf or overseeding, seed mixes are selected to address site-specific growing conditions (e.g., cool vs. warm-season, endophyte enhancements, tolerance to key pests, tolerance to levels of shading and annual rainfall, etc.). Non-essential traffic on athletic fields (e.g., band, phys ed) is adjusted as needed to allow repair. 5 _____

26. Soil compaction is minimized by:

    a) rotating mowing patterns; 5 _____

    b) using flotation tires on equipment; 5 _____

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c) periodic topdressing and/or aeration; and/or 5 _____

d) restricting foot and equipment traffic when soil is overly wet due to irrigation or heavy rain. 5 _____

27. Core cultivation uses hollow tines at least 3" long and is scheduled when soil moisture is adequate to pull cores but dry enough to avoid ruts and compaction from equipment. Core cultivators are of the type that do not add to compaction. *If turf aeration, infiltration and compaction are managed adequately without core aeration, score as N/A.* 5 _____

28. Turf aeration is timed to avoid periods when heavy seeding weeds (e.g., crabgrass, dandelions) are germinating or setting seeds. 5 _____

29. Topdressing material is free from glass, rocks or other debris and matches the soil type of the root zone as closely as possible. *If topdressing is not used, score as N/A.* 5 _____

30. **Bonus:** If sand topdressing is used, particle size distribution is close to that specified for U.S. Golf Association putting greens. 5 _____

Total Points Available for Turf Cultural Management **240**

Total Points Not Applicable _____

Total Points Earned for Turf Cultural Management _____

Resources for Turf Cultural Management

Daar *et al.*, 1997. Chapter 10. IPM for school lawns. Pp. 71-80. *In* IPM for Schools: A How-to Manual. US EPA. *Monitoring, tolerance levels, evaluation, cultural management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Daar, S., and T. Drlik, 1997. IPM for school lawns. Common Sense Pest Control Quarterly, 13(4):5-13. Available from the Bio-Integral Resource Center, Berkeley CA. (510) 524-2567. Web site: http://www.birc.org

Fermanian *et al.*, 1997. Controlling Turfgrass Pests. 2nd ed. *Diseases, insects and weeds; color and B&W photos, fertilization, irrigation, mowing, site preparation, thatch and compaction management.* Prentice Hall, Upper Saddle River NJ. ISBN 0-13-462433-5.

Mugaas, R.J., M.L. Agnew and N.E. Christians, 1997. Turfgrass Management for Protecting Surface Water Quality. University of Minnesota and Iowa State University Extension. *Soil preparation, fertilization, irrigation, minimizing runoff and leaching of fertilizers and pesticides.* Available at http://www.extension.umn.edu/distribution/horticulture/DG5726.html

Samples, T. and H. Savoy Jr., 1999. Chapter 7. Turfgrass, pp. 7.1 to 7.22. *In* Integrated Pest Management of Landscapes, Vail and Croker, eds. University of Tennesee Agricultural Extension Service Publication No. PB1639. *Line drawings, variety selection, soil preparation, fertilization, irrigation and aeration.* Available from Mail and Supply Office, University of Tennessee, Knoxville TN. (865) 974-7300, FAX (865) 974-2713.

Benefits of Healthy Turfgrass

- Each 25 square feet of turfgrass produces enough oxygen for one person for one day.
- Turf cover reduces rain water runoff and soil erosion.
- A thick, healthy lawn allows 15 times less runoff than poor quality turf.
- Turf builds soil through decomposition of organic matter.
- Turf absorbs greenhouse gasses such as carbon dioxide.
- Turf traps pollen and dust for breakdown by soil microbes.
- Turf reduces noise, glare and heat.

- Source: Mugaas et al., *1997.*

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Smith-Fiola, D. ed., 2000. Landscape Integrated Pest Management: An Alternative Approach to Traditional Landscape Maintenance. Sixth Edition. 259 pp. *Line drawings, soil and site preparation, fertilization, irrigation, mowing.* Available from Publications Distribution Center, Cook College, Rutgers University, 57 Dudley Road, New Brunswick NJ 08901-8520. (732) 932-9762. Web site http://www.rce.rutgers.edu

Stauffer *et al.*, 1998. Chapter 5. IPM for school athletic fields and grounds. Pp. 5-1 to 5-39. *In* IPM Workbook for New York State Schools. *Seed selection, mowing, fertilization, thatch management, overseeding.* Available at http://www.nysaes.cornell.edu/ipmnet/ny/urban/workbook_final.pdf

Stier *et al.*, 1999. Section 2: Outdoor turf management. 40 Pp. *In* Wisconsin's School Integrated Pest Management Manual. *Limited color photos, classifying athletic fields and detailed information on mowing, irrigation, aerification, topdressing, overseeding of athletic fields and ornamental turf.* Available at http://ipcm.wisc.edu/programs/school/default.htm

Turfgrass Information Center. *Largest collection of turf management information on-line, available for an annual subscription fee.* Michigan State University. Web site: http://www.lib.msu.edu/tgif/

US Golf Association Greens Section. *Publications on all aspects of turf management including environmental and pesticide issues, irrigation, tree care.* Available at http://www.usga.org/green/index.html

Note items requiring additional action:

About Management Units

A management unit is an area that is typically treated the same within the area. Dividing landscapes into management units permits more accurate response to site-specific conditions. For example, front lawn and back lawns may have different soil types, shading, slopes, etc. By sampling and testing soil from those areas separately, test results and fertilization will be more precise and give better results.

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Turf Disease & Nematode Pest Management

[ ] NOT APPLICABLE *(Check here if turf disease and nematode pests are not a problem requiring action at your school and proceed to the Section 47. Turf Insect and Mite Management.)*

Section 20. Dollar Spot

[ ] NOT APPLICABLE *(Check here if Dollar Spot is not a problem requiring action at your school and proceed to the next section.)*

	Points Available	Points Earned
1. **Priority:** Action thresholds for Dollar Spot are defined in the IPM Plan and effectively implemented.	20	
2. When Dollar Spot problems occur, contributing factors are identified and corrected (e.g., correct nitrogen deficiency, plant resistant varieties).	20	
3. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for Dollar Spot management.	5	
4. Turf maintenance personnel are provided with training at least annually to recognize and report Dollar Spot problems.	10	
5. **Bonus:** Pest Manager can identify Dollar Spot symptoms on sight.	*10*	
6. Least-Risk Options are the only methods used for Dollar Spot.	5	
Total Points Available for Dollar Spot Management	**60**	
Total Points Earned for Dollar Spot Management		

Section 21. Fairy Ring

[ ] NOT APPLICABLE *(Check here if Fairy Ring is not a problem requiring action at your school and proceed to the next section.)*

	Points Available	Points Earned
1. **Priority:** Action thresholds for Fairy Ring are defined in the IPM Plan and effectively implemented.	20	
2. Pesticides are ineffective and not used for Fairy Ring.	20	
3. When Fairy Ring problems occur, contributing factors are identified and corrected (e.g., remove buried stumps or wood debris, remove excess thatch).	20	
4. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for Fairy Ring management.	5	
5. Turf maintenance personnel are provided with training at least annually to recognize and report Fairy Ring problems.	10	
6. **Bonus:** Pest Manager can identify Fairy Ring symptoms on sight.	*10*	
7. Least-Risk Options are the only methods used for Fairy Ring.	5	
Total Points Available for Fairy Ring Management	**80**	
Total Points Earned for Fairy Ring Management		

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Section 22. Gray Leafspot

[ ] NOT APPLICABLE *(Check here if Gray Leafspot is not a problem requiring action at your school and proceed to the next section.)*	Points Available	Points Earned
1. **Priority:** Action thresholds for Gray Leafspot are defined in the IPM Plan and effectively implemented.	20	
2. When Gray Leafspot problems occur, contributing factors are identified and corrected (e.g., improve air circulation, reduce nitrogen fertilizer rates during hot and humid weather, reduce shading, schedule irrigation so that grass blades dry quickly after irrigating).	20	
3. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for Gray Leafspot management.	5	
4. Turf maintenance personnel are provided with training at least annually to recognize and report Gray Leafspot problems.	10	
5. **Bonus:** Pest Manager can identify Gray Leafspot symptoms on sight.	*10*	
6. Least-Risk Options are the only methods used for Gray Leafspot.	5	
Total Points Available for Gray Leafspot Management	**60**	
Total Points Earned for Gray Leafspot Management		

Section 23. Leafspot & Melting Out

[ ] NOT APPLICABLE *(Check here if Leafspot and Melting Out are not a problem requiring action at your school and proceed to the next section.)*	Points Available	Points Earned
1. **Priority:** Action thresholds for Leafspot and Melting Out are defined in the IPM Plan and effectively implemented.	20	
2. When Leafspot and Melting Out problems occur, contributing factors are identified and corrected (e.g., moderate nitrogen fertilizer rates, raise mowing height, diversify monocultures of perennial ryegrass).	20	
3. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for Leafspot and Melting Out management.	5	
4. Turf maintenance personnel are provided with training at least annually to recognize and report Leafspot and Melting Out problems.	10	
5. **Bonus:** Pest Manager can identify Leafspot and Melting Out symptoms on sight.	*10*	
6. Least-Risk Options are the only methods used for Leafspot and Melting Out.	5	
Total Points Available for Leafspot and Melting Out Management	**60**	
Total Points Earned for Leafspot and Melting Out Management		

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Section 24. Necrotic Ring Spot/Summer Patch

[ ] NOT APPLICABLE *(Check here if Necrotic Ring Spot/Summer Patch are not problems requiring action at your school and proceed to the next section.)*

	Points Available	Points Earned
1. **Priority:** Action thresholds for Necrotic Ring Spot/Summer Patch are defined in the IPM Plan and effectively implemented.	20	
2. When Necrotic Ring Spot/Summer Patch problems occur, contributing factors are identified and corrected (e.g., avoid moisture stress, moderate fertilizer use to reduce lush soft growth, resistant varieties are planted).	20	
3. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for Necrotic Ring Spot/Summer Patch management.	5	
4. Turf maintenance personnel are provided with training at least annually to recognize and report Necrotic Ring Spot/Summer Patch problems.	10	
5. **Bonus:** Pest Manager can identify Necrotic Ring Spot/Summer Patch symptoms on sight.	*10*	
6. Least-Risk Options are the only methods used for Necrotic Ring Spot/Summer Patch.	5	
Total Points Available for Necrotic Ring Spot/Summer Patch Mgt.	**60**	
Total Points Earned for Necrotic Ring Spot/Summer Patch Management		

Section 25. Powdery Mildew

[ ] NOT APPLICABLE *(Check here if Powdery Mildew is not a problem requiring action at your school and proceed to the next section.)*

	Points Available	Points Earned
1. **Priority:** Action thresholds for Powdery Mildew are defined in the IPM Plan and effectively implemented.	20	
2. When Powdery Mildew problems occur, contributing factors are identified and corrected (e.g., increase air circulation, plant resistant varieties or species in powdery mildew prone areas, reduce shading).	20	
3. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for Powdery Mildew pest management.	5	
4. Turf maintenance personnel are provided with training at least annually to recognize and report Powdery Mildew problems.	10	
5. **Bonus:** Pest Manager can identify Powdery Mildew symptoms on sight.	*10*	
6. Least-Risk Options are the only methods used for Powdery Mildew.	5	
Total Points Available for Powdery Mildew Management	**60**	
Total Points Earned for Powdery Mildew Management		

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Section 26. Pythium

[ ] NOT APPLICABLE *(Check here if Pythium is not a problem requiring action at your school and proceed to the next section.)*

	Points Available	Points Earned
1. **Priority:** Action thresholds for Pythium are defined in the IPM Plan and effectively implemented.	20	
2. When Pythium problems occur, contributing factors are identified and corrected (e.g., improve aeration and drainage, mow only when turf is dry, reduce irrigation).	20	
3. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for Pythium pest management.	5	
4. Turf maintenance personnel are provided with training at least annually to recognize and report Pythium problems.	10	
5. **Bonus:** Pest Manager can identify Pythium symptoms on sight.	*10*	
6. Least-Risk Options are the only methods used for Pythium.	5	
Total Points Available for Pythium Management	**60**	
Total Points Earned for Pythium Management		

Section 27. Red Thread

[ ] NOT APPLICABLE *(Check here if Red Thread is not a problem requiring action at your school and proceed to the next section.)*

	Points Available	Points Earned
1. **Priority:** Action thresholds for Red Thread are defined in the IPM Plan and used to guide management decisions.	20	
2. When Red Thread problems occur, contributing factors are identified and corrected (e.g., avoid overwatering especially during cool weather, correct nitrogen deficiencies with a quick release nitrogen fertilizer).	20	
3. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for Red Thread management.	5	
4. Turf maintenance personnel are provided with training at least annually to recognize and report Red Thread problems.	10	
5. **Bonus:** Pest Manager can identify Red Thread symptoms on sight.	*10*	
6. Least-Risk Options are the only methods used for Red Thread.	5	
Total Points Available for Red Thread Management	**60**	
Total Points Earned for Red Thread Management		

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Section 28. Rhizoctonia Blight (Brown Patch)

[ ] **NOT APPLICABLE** *(Check here if Rhizoctonia Blight is not a problem requiring action at your school and proceed to the next section.)*	Points Available	Points Earned
1. **Priority:** Action thresholds for Rhizoctonia Blight are defined in the IPM Plan. Actions are taken only when the disease has been correctly diagnosed and action thresholds are reached.	20	
2. When Rhizoctonia Blight problems occur, contributing factors are identified and corrected (e.g., increase aeration, improve drainage, moderate nitrogen fertilizer rates, plant resistant varieties).	20	
3. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for Rhizoctonia Blight management.	5	
4. Turf maintenance personnel are provided with training at least annually to recognize and report Rhizoctonia Blight problems.	10	
5. **Bonus:** Pest Manager can identify Rhizoctonia Blight symptoms on sight.	*10*	
6. Least-Risk Options are the only methods used for Rhizoctonia Blight.	5	
Total Points Available for Rhizoctonia Blight Management	**60**	
Total Points Earned for Rhizoctonia Management		

Section 29. Rusts

[ ] **NOT APPLICABLE** *(Check here if rusts are not a problem requiring action at your school and proceed to the next section.)*	Points Available	Points Earned
1. **Priority:** Action thresholds for rusts are defined in the IPM Plan and effectively implemented.	20	
2. When rust problems occur, contributing factors are identified and corrected (e.g., restore turf vigor, schedule irrigation so that grass blades dry quickly after irrigating).	20	
3. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for rust management.	5	
4. Turf maintenance personnel are provided with training at least annually to recognize and report rust problems.	10	
5. **Bonus:** Pest Manager can identify rust symptoms on sight.	*10*	
6. Least-Risk Options are the only methods used for rust.	5	
Total Points Available for Rust Management	**60**	
Total Points Earned for Rust Management		

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Section 30. Other Turf Diseases & Nematode Pests

[ ] NOT APPLICABLE (*Check here if there are no other turf disease or nematode pests requiring action at your school and proceed to the next section.)*

	Points Available	Points Earned
1. **Priority:** Action thresholds for these additional turf diseases or nematodes are defined in the IPM Plan and effectively implemented.	20	
2. When problems occur, the disease or nematode is identified correctly before taking action. Actions are appropriate for the problem.	20	
3. Contributing factors are identified and corrected. **List here:**	20	
4. Action thresholds for key turf diseases are adjusted according to the level of need, i.e. lawns can sustain higher pest levels than athletic fields during the playing season before action is justified.	10	
5. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for turf disease and nematode pest management.	5	
6. **Bonus:** Pest Manager can identify on sight symptoms of these additional disease or nematode pests of turf common to the region. **List here:**	*10*	
7. Least-Risk Options are the only methods used for turf disease and nematode pest management.	5	
Total Points Available for Other Turf Disease and Nematode Mgt.	**80**	
Total Points Earned for Other Turf Disease and Nematode Mgt.		

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Resources for Turf Disease and Nematode Pest Management

Choate, P.M., T.R.Fasulo and P.H. Hope. 2000. Lawn Pest Tests. *Series of interactive quizzes on lawn pests based on the CD-ROM Pests in and Around the Home.* Available at http://extlab7.entnem.ufl.edu/Pest_test/

Daar *et al.*, 1997. Chapter 10. IPM for school lawns. Pp. 71-80. *In* IPM for Schools: A How-to Manual. US EPA. *Monitoring, tolerance levels, evaluation, Fusarium management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Fermanian, T.W., M.C. Shurtleff, R. Randell, H.T. Wilkinson and P.L. Nixon, 1997. Controlling Turfgrass Pests. 2nd ed. 655 pp. Prentice Hall, Upper Saddle River NJ. ISBN 0-13-462433-5. Color and B&W photos; identification, biology, monitoring and management of insect, disease and weed pests; cultural management; application equipment calibration; pesticide safety.

Flint, M.L., ed., 2000. Pests of Turfgrass. University of California Statewide IPM Project. *Color images, description, biology and management.* Available at http://www.ipm.ucdavis.edu/PMG/selectnewpest.turfgrass.html

North Carolina State University, 1995. TurfFiles Web Site. *Color images, descriptions, biology and management.* Available at http://www.ces.ncsu.edu/TurfFiles/index.html

Stauffer *et al.*, 1998. IPM for school turfgrass. Pp. 5-6 to 5-37. *In* IPM Workbook for New York State Schools. *Turfgrass disease calendar, preparing samples for shipment to a diagnostic library.* Available at http://www.nysaes.cornell.edu/ipmnet/ny/urban/workbook_final.pdf

Smiley, R. W., P. H. Dernoeden and B. B. Clarke, 1992. Compendium of Turfgrass Diseases. 2nd Edition. 98 pp. *Color and B&W photos, line drawings, identification, biology, monitoring and management.* American Phytopathological Society, St. Paul MN. ISBN 0-89054-124-8.

Smith-Fiola, D. ed., 2000. Landscape Integrated Pest Management: An Alternative Approach to Traditional Landscape Maintenance. Sixth Edition. 259 pp. *Line drawings, identification key to common turfgrass diseases, biology, monitoring and management.* Available from Publications Distribution Center, Cook College, Rutgers University, 57 Dudley Road, New Brunswick NJ 08901-8520. (732) 932-9762. Web site http://www.rce.rutgers.edu

Stier *et al.*, 1999. Section 3: Outdoor insect and disease management. 7 pp. *In* Wisconsin's School Integrated Pest Management Manual. *Identification, biology, management.* Available at http://ipcm.wisc.edu/programs/school/default.htm

Windham, A., 1999. Chapter 9. Turfgrass diseases and their control, pp. 9.1 to 9.8. *In* Integrated Pest Management of Landscapes, Vail and Croker, eds. University of Tennesee Agricultural Extension Service Publication No. PB1639. *Description, host varieties and management of 16 common diseases of turf plants.* Available from Mail and Supply Office, University of Tennessee, Knoxville TN. (865) 974-7300, FAX (865) 974-2713.

IPM for School Lawns

"Because the bodies of children and youths are often in direct contact with the grass, use of pesticides on lawns increasingly raises concerns among parents and health professionals. On the other hand, coaches and school administrators are under pressure to insure quality turf for use by students and by community athletic leagues. In addition, the competence of landscape maintenance staff is often judged by the aesthetic appearance of the lawns that surround most schools. These various viewpoints often come into conflict when pests threaten lawns.

The key to lawn IPM is the use of cultural practices that optimize growth of grasses and minimize conditions favorable to pest insects, weeds or pathogens.

An IPM approach to lawn management begins with a monitoring program. Monitoring enables Pest Managers to do the following:

- identify the pest(s)
- identify any natural enemies of the pest(s)
- apply preventive methods to reduce the occurrence of pest poblems
- determine *if* any treatment is needed
- determine where, when and what kinds of treatments are needed
- evaluate and fine-tune treatments as the pest management program continues over the seasons"

- Excerpt from Daar et al. *1997*

Turf Insect & Mite Pest Management

[ ] NOT APPLICABLE *(Check here if turf insect and mite pests are not a problem requiring action at your school and proceed to Section 53. Vertebrate Pests)*

Section 31. Billbugs

[ ] NOT APPLICABLE *(Check here if billbugs are not a problem requiring action at your school and proceed to the next section.)*

		Points Available	Points Earned
1.	**Priority:** Action thresholds for billbugs are defined in the IPM Plan and effectively implemented.	20	
2.	When billbug problems occur, contributing factors are identified and corrected (e.g., plant resistant varieties, reduce thatch buildup).	20	
3.	Billbug larvae are sampled by pulling turf and examining the crown areas for larvae and frass and/or adults are sampled using pitfall traps (i.e., place cups or cans in the ground so that the lip is at ground level.)	10	
4.	Insecticides are applied only when billbug adults are present and before substantial egg laying has occurred. *If billbugs are managed effectively without insecticides, score as N/A.*	10	
5.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for billbug pest management.	5	
6.	Turf maintenance personnel are provided with training at least annually to recognize and report billbugs and damage.	10	
7.	**Bonus:** Pest Manager can identify billbugs common to the region on sight (e.g., Bluegrass, Denver, Hunting, Lesser, Phoenix Billbugs).	*10*	
8.	Least-Risk Options are the only methods used for billbug management.	5	
	Total Points Available for Billbug Management	**80**	
	Total Points Not Applicable		
	Total Points Earned for Billbug Management		

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Section 32. Chinch Bugs

[ ] NOT APPLICABLE *(Check here if chinch bugs are not a problem requiring action at your school and proceed to the next section.)*

Common Key Pests on School Grounds

		Points Available	Points Earned
1.	**Priority:** Action thresholds for chinch bugs are defined in the IPM Plan and effectively implemented.	20	
2.	When chinch bug problems occur, contributing factors are identified and corrected (e.g., correct compaction to improve water infiltration, increase irrigation during hot dry weather, moderate fertilizer rates and use slow release forms of nitrogen, plant resistant varieties, reduce thatch buildup).	20	
3.	Pest Manager can distinguish chinch bugs from beneficial big-eyed bugs.	10	
4.	Turf is monitored just before and during the hottest months of the season for chinch bugs (i.e., starting in April in Florida, late June in Wisconsin), and weekly at the start of the second generation, which is often the most damaging.	10	
5.	Chinch bug are sampled by the flotation method (i.e., using a board, gloves or other hand protection, press a coffee can with both ends cut out two to three inches into the soil, fill with water and count the chinch bugs that float to the surface within five to ten minutes).	10	
6.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for chinch bug management.	5	
7.	Turf maintenance personnel are provided with training at least annually to recognize and report chinch bugs and damage.	10	
8.	**Bonus:** Pest Manager can identify chinch bugs common to the region on sight (e.g., Hairy, Southern Chinch Bugs).	*10*	
9.	Least-Risk Options are the only methods used for chinch bug management.	5	
	Total Points Available for Chinch Bug Management	**90**	
	Total Points Earned for Chinch Bug Management		

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Section 33. Mole Crickets

[ ] NOT APPLICABLE (*Check here if Mole Crickets are not a problem requiring action at your school and proceed to the next section.)*

		Points Available	Points Earned
1.	**Priority:** Action thresholds for mole crickets are defined in the IPM Plan and effectively implemented.	20	
2.	When mole cricket problems occur, contributing factors are identified and corrected (e.g., irrigate deeply and less frequently to encourage deep rooting, plant resistant varieties, raise mower height).	20	
3.	Mole crickets are sampled by a soapy water drench (i.e., drench a measured area of turf with soapy water poured from a sprinkling can, and count the number of mole crickets that emerge) and/or turf is monitored in early season for adults forming calling chambers.	10	
4.	When a pesticide is necessary, a spot application is limited to infested areas instead of treating an entire lawn or field. Treated areas are re-sampled to evaluate results and retreated if needed. *If mole crickets are managed effectively without insecticides, score as N/A.*	10	
5.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for mole cricket pest management.	5	
6.	Turf maintenance personnel are provided with training at least annually to recognize and report mole crickets and damage.	10	
7.	**Bonus:** Pest Manager can identify mole crickets common to the region on sight (e.g., Northern, Short-Winged, Southern, Tawny Mole Crickets).	*10*	
8.	Least-Risk Options are the only methods used for mole cricket management.	5	
	Total Points Available for Mole Cricket Management	**80**	
	Total Points Not Applicable		
	Total Points Earned for Mole Cricket Management		

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Section 34. Turf-Feeding Caterpillars: Armyworms, Cutworms, Sod Webworms

	Points Available	Points Earned
[ ] NOT APPLICABLE *(Check here if turf-feeding caterpillars are not a problem requiring action at your school and proceed to the next section.)*		
1. **Priority:** Action thresholds for problem turf-feeding caterpillars are defined in the IPM Plan and effectively implemented.	20	
2. When problems occur, the caterpillar is identified correctly before taking action. Actions are appropriate for the problem caterpillar.	20	
3. When turf-feeding caterpillar problems occur, contributing factors are identified and corrected (e.g., correct problem drainage areas, moderate fertilizer rates and use slow release forms of nitrogen, reduce thatch buildup).	20	
4. Action thresholds are based on numbers of feeding caterpillars.	10	
5. Pesticides, if used, are applied only when feeding caterpillars are present. *If caterpillars are effectively managed without pesticides, score as N/A.*	10	
6. Turf-feeding caterpillars are sampled by a soapy water drench (i.e., drenching a measured area of turf with soapy water poured from a sprinkling can, and counting the number of turf-feeding caterpillars that emerge) and/or pheromone or blacklight traps for adults.	10	
7. When a pesticide is necessary, a spot application is limited to infested areas instead of treating an entire lawn or field. *If caterpillars are effectively managed without pesticides, score as N/A.*	10	
8. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for turf-feeding caterpillar pest management.	5	
9. Turf maintenance personnel are provided with training at least annually to recognize and report turf-feeding caterpillars and damage.	10	
10. **Bonus:** Pest Manager can identify turf-feeding caterpillars common to the region on sight (e.g., armyworms, cutworms, Sod Webworms).	*10*	
11. Least-Risk Options are the only methods used for turf-feeding caterpillar management.	5	
Total Points Available for Turf-Feeding Caterpillar Management	**120**	
Total Points Not Applicable	____	
Total Points Earned for Turf-Feeding Caterpillar Management		

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Section 35. White Grubs

[ ] NOT APPLICABLE *(Check here if white grubs are not a problem requiring action at your school and proceed to the next section.)*

Common Key Pests on School Grounds

		Points Available	Points Earned
1.	**Priority:** Action thresholds for problem white grubs are defined in the IPM Plan and effectively implemented.	20	
2.	When problems occur, the white grub is identified correctly before taking action. Actions are appropriate for the problem grub.	20	
3.	When white grub problems occur, factors contributing to the problem are identified and corrected (e.g., correct compaction to improve water infiltration, correct problem drainage areas).	20	
4.	White grubs are sampled by extracting a turf core with a bulb planter or golf course cup cutter, by cutting and peeling back a square of turf and counting the number of white grubs present, and/or by pheromone or blacklight trapping of adult beetles.	10	
5.	Action thresholds for grubs are appropriate to the problem species (i.e., turf can withstand much higher number of Black Turfgrass Ataenius beetles (30 to 50 per sq. ft.) than European Chafers (0.5 to 7 per sq. ft.) before action is required).	10	
6.	Insecticides, if used for grubs, are applied when grubs are small (e.g., fall for Japanese Beetle, Green June Bug). Insecticide treatments are not made after grubs have stopped feeding. *If grubs are managed effectively without insecticides, score as N/A.*	10	
7.	Action thresholds for grubs are appropriate to the pest management unit (i.e. actions are taken on high-profile lawns at a lower threshold than less visible or infrequently used lawn areas).	10	
8.	When a pesticide is necessary, a spot application is limited to infested areas instead of treating an entire lawn or field. *If grubs are managed effectively without insecticides, score as N/A.*	10	
9.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for white grub management.	5	
10.	Turf maintenance personnel are provided with training at least annually to recognize and report white grubs and white grub damage.	10	
11.	**Bonus:** Pest Manager can identify white grubs common to the region on sight (e.g., Asiatic Garden Beetle, Black Turfgrass Ataenius, Green June Beetle, Japanese Beetle, Masked Chafer, May/June beetles, Oriental Beetle).	*10*	
12.	Least-Risk Options are the only methods used for white grubs.	5	
	Total Points Available for White Grub Management	**130**	
	Total Points Not Applicable		
	Total Points Earned for White Grub Management		

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Section 36. Other Turf Insect & Mite Pests

[ ] NOT APPLICABLE *(Check here if there are no other turf insect or mite pest problems requiring action at your school and proceed to the next section.)*

		Points Available	Points Earned
1.	**Priority:** Action thresholds for these additional turf insect or mite pests are defined in the IPM Plan and effectively implemented.	20	
2.	When problems occur, the pest is identified correctly before taking action. Actions are appropriate for the problem pest.	20	
3.	Contributing factors are identified and corrected. **List here:**	20	
4.	Action thresholds for key turf insect and mite pests are adjusted according to the level of need (i.e. lawns can sustain higher pest levels than athletic fields during the playing season).	10	
5.	**Priority:** Reduced-Risk or Least-Risk Options are the only methods used for turf insect and mite management.	5	
6.	**Bonus:** Pest Manager can identify these additional turf insect and mite pests on sight. **List here:**	*10*	
7.	Least-Risk Options are the only methods used for turf insect and mite management.	5	
	Total Points Available for Other Turf Insect or Mite Pest Management	**80**	
	Total Points Earned for Other Turf Insect or Mite Pest Management		

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Resources for Turf Insect and Mite Pest Management:

Daar *et al.*, 1997. Chapter 10. IPM for school lawns. Pp. 71-80. *In* IPM for Schools: A How-to Manual. US EPA. *Biology, identification, monitoring, chinch bug management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Fermanian, T.W., M.C. Shurtleff, R. Randell, H.T. Wilkinson and P.L. Nixon, 1997. Controlling Turfgrass Pests. 2nd ed. 655 pp. Prentice Hall, Upper Saddle River NJ. ISBN 0-13-462433-5. Color and B&W photos; identification, biology, monitoring and management of insect, disease and weed pests; cultural management; application equipment calibration; pesticide safety.

Flint, M.L., ed., 2000. Pests of Turfgrass. University of California Statewide IPM Project. *Color images, description, biology and management.* Available at http://www.ipm.ucdavis.edu/PMG/selectnewpest.turfgrass.html

Frank, J.H., T.R. Fasulo and D.E. Short, 1995. Mcricket; Alternative Methods of Mole Cricket Control. *Color and B&W images, identification, biology, monitoring and management of mole crickets.* University of Florida. Available at http://www.ifas.ufl.edu/~ent1/mcricket/index.htm

Hellman, J.L., 1998. Turfgrass insects. *In* The National Park Service Integrated Pest Management Manual, T. Cacek, ed. National Park Service, Fort Collins CO. *Description, biology, monitoring and management of exotic and common weed species.* Available at http://www1.nature.nps.gov/wv/ipm/tmanual.htm

Koehler *et al.*, 1999. School IPM Web Site. University of Florida. *Limited color images of turf insect pests and beneficials.* Available at http://www.ifas.ufl.edu/~schoolipm/

Potter, D.A., 1998. Destructive Turfgrass Insects: Biology, Diagnosis, and Control. 344 pp. Ann Arbor Press, 121 S. Main St., Chelsea MI 48118.

Short, D.E. and R.J. Black. 1997. Southern Chinch Bug Management on St. Augustine grass. University of Florida Cooperative Extension. *Line drawings, identification, biology, monitoring, management.* Available at http://edis.ifas.ufl.edu/BODY_LH036

Short, D.E. and R.J. Black. 1997. Management of Sod Webworm and other Lawn Caterpillars. University of Florida Cooperative Extension. *Line drawings, identification, biology, monitoring, management.* Available at http://edis.ifas.ufl.edu/BODY_LH038

Stauffer *et al.*, 1998. IPM for School Turfgrass. Pp. 5-6 to 5-16. *In* IPM Workbook for New York State Schools. *Biology, identification, monitoring, management.* Available at http://www.nysaes.cornell.edu/ipmnet/ny/urban/workbook_final.pdf

Stier *et al.*, 1999. Section 3: Turf insects. 3 pp. *In* Wisconsin's School Integrated Pest Management Manual. *Limited color photos, biology, management for white grubs, cutworms and chinch bugs.* Available at http://ipcm.wisc.edu/programs/school/default.htm

Vail, K. and F. Hale. 1999. Chapter 8. Insects and other pests associated with turf. Pp. 8.1 to 8.21. In K. M. Vail and J. L. Croker, eds. Integrated Pest Management of Landscapes. University of Tennesee Agricultural Extension Service Publication No. PB1639, Knoxville TN. *Biology, identification keys with line drawings, monitoring, management.* Available from Mail and Supply Office, University of Tennessee, (865) 974-7300, FAX (865) 974-2713.

Vertebrate Pests

Section 37. Vertebrate Pests: Coyotes, Deer, Feral Cats and Dogs, Gophers, Moles, Rabbits, Raccoons, Rodents, Skunks, Snakes, Woodchucks, etc.

[ ] NOT APPLICABLE *(Check here if vertebrates are not a problem requiring action at your school and proceed to the next section.)*

		Points Available	Points Earned
Common Key Pests on School Grounds	1. **Priority:** Persons handling vertebrate traps or bait stations or inspecting suspected harborages (e.g., crawl spaces, attics) are trained in public health risks and proper hygiene and wear appropriate protective gear. Traps, bait stations or other surfaces contaminated with urine or feces are properly disposed of or disinfected.	20	_____
	2. **Priority:** Pest Manager is aware of and understands Federal, state and local laws pertaining to vertebrate pest management and protected/endangered vertebrate species.	20	_____
	3. **Priority:** Action thresholds for key vertebrate pests are defined in the IPM Plan and effectively implemented.	20	_____
	4. When problems occur with vertebrate pests, contributing factors are identified and corrected (e.g., denying access to food, water or shelter by exclusion, sanitation, replacing vertebrate pest-prone plants, etc.).	20	_____
	5. Legible records are maintained indicating when key vertebrate pests appear, relative abundance and impacts from one year to the next. This information is used to evaluate and adjust pest management strategies.	10	_____
	6. Pesticides (e.g., toxic baits) are used only when action thresholds are exceeded and only by personnel fully trained in bait selection (coagulant vs. anticoagulants, blocks vs. pellets vs. grain-based, tracking powders, etc.). *If vertebrate pests are managed effectively without pesticides, score as N/A.*	10	_____
	7. A communications program is in place to school staff and students about their role in preventing and reporting vertebrate pest problems.	10	_____
	8. **Priority:** Snap traps, if used for vertebrate pests, are placed only in areas not accessible to children (e.g., in locked outbuildings, inaccessible animal dens or tamper-proof containers securely attached to the ground so that the container cannot be picked up or moved). *If vertebrate pests are managed effectively without snap traps, score as N/A.*	20	_____
	9. Inspections for vertebrate pests include examining school grounds for food sources (e.g., edible plants, fallen fruit and nuts), animal feces, nests, etc. If signs of vertebrate feeding or activity are found, conditions favoring pests are corrected (e.g., modify stretches of dense vegetation or tall ground cover that allow vertebrate pests to travel long distance under cover).	10	_____

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10. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for vertebrate pest management.	5	_____
11. **Bonus:** Teachers incorporate IPM for vertebrate pests into curricula and/or class projects.	*10*	_____
12. **Bonus:** Pest Manager can identify vertebrate pests common to the region on sight.	*10*	_____
13. Least-Risk Options are the only methods used for vertebrate pest management.	5	_____
Total Points Available for Vertebrate Pest Management	**150**	
Total Points Not Applicable		____
Total Points Earned for Vertebrate Pest Management		_____

Resources for Vertebrate Pest Management:

Daar *et al.*, 1997. Chapter 10. IPM for School Lawns, pp. 71-80; Chapter 18. IPM for weeds on school grounds, pp. 139-143. *In* IPM for Schools: A How-to Manual. US EPA. *Transect method for monitoring weeds in lawns; line drawings, identification, tolerance levels, monitoring, management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Dixon, C. and C. Harper, 1999. Chapter 10. Managing problem vertebrates in the suburban landscape. Pp. 10.1 to 10.20. *In* K. M. Vail and J. L. Croker, eds. Integrated Pest Management of Landscapes. University of Tennesee Agricultural Extension Service Publication No. PB1639, Knoxville TN. *Description, biology and management of 25 common vertebrate pests, list of suppliers of repellents, traps, etc.* Available from Mail and Supply Office, University of Tennessee, (865) 974-7300, FAX (865) 974-2713.

Flint, M.L., ed., 2000. Pests of Home and Landscape. University of California Statewide IPM Project. *Color images, description, biology and management of squirrels, gophers, rabbits and voles.* Available at http://www.ipm.ucdavis.edu/PMG/selectnewpest.home.html

Stier *et al.*, 1999. Section 4: Outdoor Vertebrate Pest Management. 18 pp. *In* Wisconsin's School Integrated Pest Management Manual. *Identification, biology, damage, management checklist.* Available at http://ipcm.wisc.edu/programs/school/default.htm

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Vertebrate Pests

Section 38. Weeds

		Points Available	Points Earned
Common Key Pests on School Grounds	1. **Priority:** Action thresholds for key weed pests are defined in the IPM Plan and effectively implemented.	20	
	2. Rough weed maps or diaries are prepared at least annually for areas where weeds are growing, noting which weeds are present and where.*	20	
	3. When weed problems occur, contributing factors are identified and corrected (e.g., compaction, low nutrient levels, improper plant placement).	20	
	4. Legible records are maintained indicating when key weed pests appear, relative abundance and impacts (e.g., control costs, complaints, etc.) from one year to the next. This information is used to evaluate and adjust weed management strategies.	10	
	5. Where appropriate, spot treatments are made rather than area-wide treatments (e.g., a wick-type herbicide applicator is used to apply a small amount of herbicide on individual weeds or patches of weeds). *If weeds are managed without herbicides, score as N/A.*	10	
	6. Herbicides are applied when students are not present (e.g., after the school day, weekends, school breaks). *If weeds are managed without herbicides, score as N/A.*	10	
	7. **Priority:** Reduced-Risk or Least-Risk Options are the only methods used for weed management.	5	
	8. **Bonus:** Herbicides are not applied for weeds that are aesthetic problems only.	*10*	
	9. **Bonus:** Pest Manager can identify problem weeds common to the region on sight, including those designated as noxious weeds or protected plants by federal, state or local laws.	*10*	
	10. **Bonus:** Pest Manager knows the requirements for growth and methods of reproduction for key weed pests.	*5*	
	11. Least-Risk Options are the only methods used for weed management.	5	
	Total Points Available for Weed Management	**100**	
	Total Points Not Applicable		
	Total Points Earned for Weed Management		

*Great class project idea!

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Resources for Weed Management:

Daar *et al.*, 1997. Chapter 10. IPM for School Lawns, pp. 71-80; Chapter 18. IPM for weeds on school grounds, pp. 139-143. *In* IPM for Schools: A How-to Manual. US EPA. *Transect method for monitoring weeds in lawns; line drawings, identification, tolerance levels, monitoring, management.* Available at http://www.epa.gov/region09/toxic/pest/school/index.html

Fermanian, T.W., M.C. Shurtleff, R. Randell, H.T. Wilkinson and P.L. Nixon, 1997. Controlling Turfgrass Pests. 2nd ed. 655 pp. Prentice Hall, Upper Saddle River NJ. ISBN 0-13-462433-5. Color and B&W photos; identification, biology, monitoring and management of insect, disease and weed pests; cultural management; application equipment calibration; pesticide safety.

Raupp, M.J., 1998. Exotic weeds I and II; W.O. Lamp, Thistles, Leafy Spurge; and C.A. Casey, Weeds of developed and historic sites. *In* The National Park Service Integrated Pest Management Manual, T. Cacek, ed. National Park Service, Fort Collins CO. *Description, biology, monitoring and management of exotic and common weed species.* Available at http://www1.nature.nps.gov/wv/ipm/tmanual.htm

> "School landscape maintenance budgets rarely stretch far enough to suppress all weeds, even if that were desirable. Identify areas where weeds pose potential health or safety hazards or threaten damage to facilities, and distinguish these locations from those where weeds are considered aesthetic problems alone."
>
> - *Excerpt from Daar* et al. *1997*

Flint, M. L., J. Kwan and C. Reynolds, 2000. Weed Photo Gallery Web Site. University of California Statewide IPM Project. *Color images of over 100 common weeds.* Available at http://www.ipm.ucdavis.edu/PMG/weeds_common.html

New Jersey Weed Gallery, Rutgers University. *Color weed photos of more than 100 weed species, indexed by common and Latin names, plus thumbnail photo index.* Available at http://www.rce.rutgers.edu/weeds/index.html

Stier *et al.*, 1999. Section 2: Outdoor turf management; Appendix. *In* Wisconsin's School Integrated Pest Management Manual. *Limited color photos, weed management by level of use for athletic fields and landscape areas; herbicide comparisons, corn gluten meal as a preemergent herbicide.* Available at http://ipcm.wisc.edu/programs/school/default.htm

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IPM Scorecard for School Grounds

Enter points earned for each category in Column D. If sections or points within a section are not applicable to your school, enter the total points available for that section in Column C. Sum all columns. A 70% score overall is required for certification.

A. Module/Section	B. Total Points Available	C. Points Not Applicable	D. Points Earned
1. MODULE ONE: IPM Foundation Practices	300		
2. MODULE TWO: IPM Framework Practices	265		
3. MODULE THREE: Administrative and Policy Practices	375		
4. Landscape Plant Cultural Management	220		
5. Canker Diseases	105		
6. Leafspots & Blights	80		
7. Nematodes	80		
8. Root & Crown Diseases	90		
9. Rusts	90		
10. Virus Diseases	60		
11. Wilts	90		
12. Other Landscape Plant Disease & Nematode Pests	80		
13. Bark, Trunk & Twig Borers	110		
14. Caterpillars	120		
15. Leaf Beetles & Weevils	120		
16. Sap-Feeding Pests	110		
17. Sawflies	110		
18. Other Landscape Plant Insect & Mite Pests	80		
19. Turf Cultural Management	245		
20. Dollar Spot	60		
21. Fairy Ring	80		
22. Gray Leafspot	60		
23. Leafspot & Melting Out	60		
24. Necrotic Ring Spot/Summer Patch	60		
25. Powdery Mildew	60		
26. Pythium	60		
27. Red Thread	60		

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28. Rhizoctonia Blight	60		
29. Rusts	60		
30. Other Turf Disease & Nematode Pests	80		
31. Billbugs	80		
32. Chinch Bugs	90		
33. Mole Crickets	80		
34. Turf-Feeding Caterpillars	120		
35. White Grubs	130		
36. Other Turf Insect & Mite Pests	80		
37. Vertebrate Pests	150		
38. Weeds	100		
I. Sum of each column	4260		
II. Total Adjusted Points Available (sum of Column B – sum of Column C)		XX	XX
III. Percent Score (Divide sum of Column D by Points in Line II):		XX	XX

Where do you stand along the IPM Continuum?

Score:

0%	25%	50%	75%	100%
Entry Level IPM		IPM Achiever		IPM Excellence

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Appendix A. Reduced-Risk and Least-Risk Pest Control Option Definitions

Introduction

How do you decide which is the best legally permitted option to use when pests exceed acceptable levels? Safety (degree of risk) should be primary considerations, along with effectiveness, convenience and cost.

Risk depends upon **hazard** (toxicity) and **exposure**. A measure of hazard to humans and other mammals is provided by signal words on pesticide labels. The most toxic are labeled DANGER, followed by WARNING. The least toxic are labeled CAUTION. Other potential hazards include possible carcinogens (cancer-causing substance) or endocrine-disrupting ingredients (substances that may adversely affect the action of hormones in wildlife and humans). These criteria are not identified on the pesticide labels. Risk occurs where humans, wildlife or other non-target organisms are exposed, or come into contact with, hazardous substances.

We have devised the following system to identify and direct those working in schools and other sensitive environments towards pest control options with lesser risks. A Pest Control Options Review Committee, appointed by the IPM Institute and made up of professionals from Universities, Extension, government agencies, industry and public and environmental organizations, maintains these definitions and may rule on exceptions.

Certified schools may not use pesticides labeled WARNING or DANGER. Certified schools may use some pesticides labeled CAUTION, if they meet the criteria defined on the following page, which consider primarily toxicity to mammals, birds, fish and beneficial organisms and low potential for groundwater contamination. All pesticides are to be used only when needed according to monitoring, inspection and predetermined action thresholds, and based on proper pest identification and diagnosis.

The Pest Control Option Review Committee may choose to exempt specific materials from these restrictions where the formulation or use greatly reduces potential for exposure or where lesser risk options are not available to address significant pest threats. These exempted materials will be added to the Pest Control Options List with an explanation of why the exemption was enacted.

Any system to rank risks and direct use towards lesser risk alternatives will be less than perfect. Using the system presented here leaves important concerns unanswered. For example, is using a large quantity of a material defined as "least-risk" better than using a smaller amount of a "reduced-risk" material? This system does not fully evaluate the inert ingredients in pesticides, due to the difficulty in obtaining that information. Finally, reducing risk is ultimately the responsibility of everyone involved in the selection, purchase, transportation, storage and use all pest control options in a legal and responsible manner, following all label directions.

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Definitions

For a list of options meeting the Reduced or Least-Risk definitions, contact the IPM Institute or visit the Web site at http://www.ipminstitute.org. NOTE: Not all materials meeting these definitions may be permitted in your state or region. The user bears all responsibility for conforming to Federal, state and local regulations for use of all pesticides.

Least-Risk Options:

1. Pesticides with very low mammalian toxicity via oral, inhalation or dermal routes, no eye effects, mild or slight skin effects (= EPA Toxicity Category IV); or
2. EPA Toxicity Category III insecticidal baits in ready-to-use, non-volatile formulations and placed in areas inaccessible to children and the general public; or
3. EPA Toxicity Category III rodenticides in bait-block, non-volatile formulations placed in tamper-proof bait stations in areas inaccessible to children and the general public; or
4. Non-chemical pest control options (cultural, mechanical, physical controls) with no potential physical hazards; or
5. Pesticides classified by the US EPA as exempt materials under 40 CFR 152.25.

Reduced-Risk Options:

1. Pesticides with low mammalian toxicity via oral, inhalation and dermal routes, moderate eye and skin effects (= EPA Toxicity Category III) and not meeting criteria for Least-Risk.

Prohibited Pest Control Options:

Prohibited for indoor or outdoor use:

1. Any pesticides containing active ingredients classified as known, likely or probable carcinogens or reproductive toxins according to any of the following lists: State of California EPA List of Chemicals Known to Cause Cancer or Reproductive Toxicity, State of Illinois EPA List of Known Endocrine Disrupters, US EPA List of Chemicals Evaluated for Carcinogenic Potential.
2. Any pesticides containing inert ingredients included on US EPA's List 1: Inerts of Toxicological Concern.
3. Any formulations and uses presenting a potential physical hazard or dust/powder inhalation hazard to building occupants.

In addition, any pesticides meeting the following criteria are prohibited for use outdoors:

4. Any pesticides with label precautionary statements including "toxic" or "extremely toxic" to bees, birds, fish or wildlife.**
5. Any pesticides with label precautionary statements including specific warnings regarding ground or surface water contamination.
6. Any pesticide implicated as harmful to natural enemies of pests in school environments.

***Does not apply to pesticides used as per label directions to control bird, fish, wildlife or stinging insect pests.*

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Appendix B. Glossary

Synonyms are listed in parentheses:

Action Thresholds (Action Level) – The number of pests or level of pest damage requiring action to prevent damage from exceeding tolerable levels. For some pests, the action threshold will be one, for example a single yellowjacket in a classroom.

For other pests, action may be needed before pests or pest damage appears. In those cases, an action threshold may be defined as a set of conditions, e.g., plant is at a susceptible stage and all or nearly all environmental conditions are in place for a pest problem to occur. For example, fire blight disease of rosaceous landscape plants requires (1) warm temperatures (above an average temperature of 60 F for three consecutive days); (2) a route of entry through the plants' defenses (open blossoms, hail damage or other wounds); (3) free water (heavy dew, rainfall); plus (4) availability of bacterial spores. An action level for fire-blight-susceptible plants can be defined based on the first three requirements, especially if the site or adjacent sites have a history of fire blight infected plants.

Including written action thresholds in the IPM Plan presents a clear statement of intentions before a pest event occurs. This guidance can be invaluable to those called to respond to a pest situation and can prevent under or over-reactions to pest problems.

For a great explanation of action thresholds, see Maryland Department of Agriculture, "Action Thresholds in School IPM Programs." Pesticide Regulation Section, Annapolis, MD. 10 pp. Available at http://gnv.ifas.ufl.edu/~schoolipm/tp.htm

Anti-Microbial Pesticide – A pesticide used for control of microbial pests including viruses, bacteria, algae and protozoa or the purpose of disinfecting or sanitizing. Anti-microbials do not include fungicides used on plants.

Integrated Pest Management (IPM) – An approach to maintaining insect, mite, disease, nematode, weed, or vertebrate pests at tolerable levels by using biological knowledge of pests and pest behavior to implement long-term, least-risk solutions. Pests and pest damage are monitored and action is taken only when necessary to prevent damage from exceeding tolerable levels. Actions are selected with the least risk to humans, other non-pest organisms and the environment and are carefully timed for maximum effectiveness. Strategies are implemented to resolve factors that contribute to pest problems, avoiding the need to take action in the future.

IPM Committee – This group addresses pest management issues on an ongoing basis. The committee should include representation from all segments of the school community, including administration, staff and parents. The role of the committee is to formulate IPM policy and plans and provide oversight and ongoing decision-making, incorporating input from all interested parties.

IPM Continuum – The progression of pest management strategies towards least-risk, long-term prevention and avoidance of pest problems. The Continuum begins with a focus on monitoring and chemical suppression when pests approach unacceptable levels, and ends with balanced systems where pests remain at tolerable levels with minimal cultural and biological interventions. (For more information, see back cover.)

IPM Coordinator – The school employee responsible for day-to-day interpretation of the IPM policy for a school or school system. The IPM Coordinator may or may not be a pest management professional, but is the decision-maker who receives specialized training in IPM, accesses the advice of professionals and chooses a course of action. For example, the IPM Coordinator may be the facilities manager or

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environmental manager. For schools with an in-house professional pest management program, the IPM Coordinator may also be the Pest Manager.

IPM Plan – A written document including specific information regarding the operation of the school's IPM program, such as IPM roles for all school staff, parents, students and other community members; pesticide application notification policies; list of key pests; action thresholds, a risk-based hierarchy of control options and prevention/avoidance strategies to be used for key pests; inspection schedules for school facilities; policies for working with outside contractors; lists of resources for resolving technical questions; and other pertinent information. The IPM Plan provides an excellent tool for training new personnel including during management transitions. The Plan is a "living document" updated frequently with new information as it becomes available. IPM Plans are often developed in binder format so that information can be easily added and updated.

IPM Policy – A written document stating a school's commitment to IPM and defining overall IPM goals. This document is updated periodically and used to guide decision-making as the IPM program is implemented.

Key Pest – An insect, mite, disease, nematode or weed that frequently results in unacceptable damage and thus typically requires a control action. Key pests vary from one region to the next. Key pest status is dependent on action thresholds set for the pest. For example, cutworms may be a key pest on high-visibility athletic fields, but not on adjacent lawn areas where the typical level of cutworm damage is very tolerable. Routine or regularly scheduled pesticide applications can mask key pests, which may not become apparent for some time after routine pesticide applications have been stopped.

Key Plant – A plant that frequently experiences unacceptable pest damage and thus typically requires treatment. Key plants very from one region to the next. Poor care or improper placement within the landscape can result in a plant becoming a key plant by increasing its susceptibility to pest problems.

Least-Risk Pest Control Options – Pest controls meeting specific criteria listed in Appendix A.

Management Unit – A subdivision that that is typically treated the same. Dividing landscapes into management units permits more accurate response to site-specific conditions. For example, it is often a good idea to divide school lawns into front and back lawn management units. Front lawn and back lawns may have different soil types, shading, slopes, etc. By sampling and testing soil from those areas separately, test results and fertilization will be more precise and give better results. Pest monitoring can also be conducted separately and action thresholds set higher for front lawns, because appearance is more critical than for less visible back lawns. In school buildings, pool and locker room areas, food preparation and service areas, and boiler rooms are examples of specific management units.

Pathogen – A living microorganism, usually a bacterium, fungus, mycoplasm or virus that can cause disease when a host is present under the right environmental conditions.

Pest – A term applied to an organism (e.g., insect, mite, disease, nematode, weed, vertebrate, microbe, etc.) when it causes a problem to humans. A pest in one environment can be very beneficial in another (e.g., many plants considered weeds when found in lawns can be essential to the restoration of wild landscapes after a disturbance such as flood or fire).

Pest Management Roles – The responsibilities assumed by individuals in the school system to maintain an environment free of interference from pest and pesticide risks.

Pest Manager – The individual who conducts actions and/or directs others to maintain effective pest management at a site. The Pest Manager receives specialized pest management and IPM training and is licensed and certified to apply pesticides in schools. The Pest Manager may be a school employee or a

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professional Pest Manager contracting with the school. For schools with an in-house professional pest management program, the IPM Coordinator may also be the Pest Manager.

Priority Practices – Practices in the Standards labeled "Priority" must be implemented for certification. You must earn at least 80% of the points for each Priority Practice to become IPM Certified.

Reduced-Risk Pest Control Options - Pest controls meeting specific criteria listed in Appendix A.

Scouting (Monitoring, Inspection) – Planned, regular monitoring or a crop, ornamental planting, landscape or structure for the purpose of detecting pests, pest damage or conditions conducive to pests or pest damage.

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Appendix C. Additional Resources for Implementing IPM in Schools

General Resources

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Cycling Back to Nature: Food Production and Pesticides. *Nationally juried curriculum including food production and environmental and health effects of pesticide use in agriculture; food webs and biological diversity; analysis of agriculture and pesticide use in the U.S.; global demand for food and population trends.* Available in print from National 4-H Council, 7100 Connecticut Ave, Chevy Chase MD 20815. (301) 961-2908, FAX (301) 961-2894, E-mail envstew%smtpgate@fourhcouncil.edu, more information including comments from reviewers available at http://www.reeusda.gov/4h/curricul/da2.htm

Entomological Society of America. *Educational resources including Beeswax, an entomological newsletter for kids, seasonal lesson plans including handouts and activities, project ideas, books.* Available at http://www.entsoc.org/education/index.html

Dunn, G.A. and J. VanDyk. Iowa State Entomology Index: K-12 Educators' Recommended Sites. *Links to over 30 Web sites with insect-related curricula, projects and information.* Available at http://www.ent.iastate.edu/list/k-12_educator_resources.html

Lucas, P.L. Bug-Go. University of Kentucky IPM Program. *Bingo-like game, players match pictures of beneficial insects and pests, includes player game cards, templates for overhead transparencies or display sheets, information about each insect and instructions.* Available at http://www.uky.edu/Agriculture/IPM/teachers/bug-go/bug-go.htm

Mack, T. Insects & Human Society: How insects have changed major battles, altered governments, and shaped human history. *Color images, virtual presentation including early misconceptions about insects and impacts of insect-vectored diseases on human history.* Available at http://www.ento.vt.edu/IHS/

Minnesota Ideals, 1998. The Watershed Game. *Interactive question/answer game for elementary students addressing agricultural and urban impacts on watershed health.* Available at http://www1.umn.edu/bellmuse/mnideals/watershed/watershed2.html

Pennsylvania Departments of Agriculture and Education, and Pennsylvania State University, 1998. Memorandum of Understanding. *Outlines five areas of cooperation to increase public education of IPM concepts and tools.* Available at http://paipm.cas.psu.edu/MOU.html

Pennsylvania State Department of Education, 2000. Academic Standards for Environment and Ecology, Section 4.5. Integrated Pest Management. *Detailed list of IPM topic areas to be included in curricula for students in Pennsylvania Public Schools through grade 12.* Available at http://paipm.cas.psu.edu/schools/schoolEduc.htm

PBS On-Line, 1999. Alien Empire. *Interactive puzzles; making insect masks; presentations on insect termites, beneficial wasps, insects as food; teacher's guide.* Available at http://www.pbs.org/wnet/nature/alienempire/

Safer Pest Control Project. Kid's guide to pesticides. *Two-page fact sheet in PDF format includes discussion of pests, pesticides, risks, pesticide safety.* Available at http://www.spcpweb.org/ (go to School IPM page and follow link).

Schumann, G.L., ed. APSNet Education Center: The Plant Health Instructor. American Phytopathological Society. *Plant pathology curricula for K through higher education including plant disease lessons, laboratory exercises, illustrated glossary, resource catalogs and links to additional materials.* Available at http://www.apsnet.org/education/topmenu.html

Radcliffe, T.B. and W.D. Hutchison, eds. Radcliffe's IPM World Textbook. *Electronic college-level IPM textbook including line drawings, color and B&W photos, chapters on biological and cultural control, computers in IPM, crop and commodity-specific IPM, ecology, IPM policy, medical and veterinary IPM, pesticides, stored product IPM, links to IPM resources including photographs and decision-support software.* Available at http://www.ipmworld.umn.edu/ipmsite.htm

US EPA, 2000. Learn about Chemicals Around Your House. *Interactive tutorial on toxics including disinfectants and pesticides for elementary grades including house tour, product labels, first aid, word searches and scramble, crossword puzzle.* Available at http://www.epa.gov/opptintr/kids/hometour/index.htm

US EPA Region 6, 1999. Pesticide Safety Bingo Game. 49 pp. plus cards. *Beginner and advanced level games for K-6 grades about pest management and pesticides, including instructions, background information for teachers, discussion questions, picture and text cards in English and Spanish.* Available at http://www.epa.gov/region6/6pd/bingo/index.htm

University of Connecticut IPM Program, 1999. IPM Online Home Study Courses. *Self-paced, tuition-free, non-credit tutorial-type courses with a certificate issued upon completion including IPM for cockroaches, ants/termites, turfgrass, garden weed and insect pests, resistance of woody ornamental plants to deer damage.* Available at http://www.canr.uconn.edu/ces/ipm/homecourse/coursinfo.htm

University of Florida Department of Entomology and Nematology, 2000. Best of the Bugs Web Site. *List of top web sites covering insects, mites and nematodes, including sites with teaching curricula.* Available at http://www.ifas.ufl.edu/~entweb/uf-bob/

Wyoming Agriculture in the Classroom. A Kid's Journey to Understanding Weeds. *Elementary school-level activities for students organized around 11 noxious weeds.* Available at http://www.wyoagcenter.com/waic/elem/weeds.html

Organizations with Resources for School IPM

Note: Organizations listed under state headings may have resources available and applicable to users outside of the state. No effort has been made to screen entries and no endorsement is implied. The user bears all responsibility for verifying the accuracy and propriety of information obtained from Web sites, publications, etc. For the latest version of this directory, see http://www.ifas.ufl.edu/~schoolipm/ipm_org.htm

NATIONAL

Government/University/Extension

UNIVERSITY OF FLORIDA, Dr. Philip Koehler, Urban Pest Specialist, Entomology and Nematology Department, Bldg 970, Natural Area Drive, Gainesville FL 32611-0640, (352) 392-2484, Fax (352) 846-1500, E-mail: pgk@gnv.ifas.ufl.edu

Applicator training; advice to schools districts and pest management professionals; sample/model IPM documents (e.g., contracts, policies); E-mail list server; Web site: http:www.ifas.ufl.edu/~schoolipm/ including pest management techniques from national authorities, downloadable presentations, how-to start an IPM program and sample documents.

US EPA, Office of Pesticide Programs, Kathy Seikel, Senior Policy Analyst, Biopesticides and Pollution Prevention Division, MC 7511C, 1200 Pennsylvania Ave. NW, Washington DC 20460, (703) 308-8272, Fax (703) 308-7026, E-mail: seikel.kathy@epa.gov

Citizen's Guide to Pest Control and Pesticide Safety (EPA Pub # 730-K-95-001, September 1995); Pest Control in the School Environment: Adopting IPM (EPA Pub # 735-F-93-012, August 1993); order free of charge through EPA's National Service Center for Environmental Publications at 1-800-490-9198 or at http://www.epa.gov/ncepihome publication center

Non-governmental, non-profit organizations

BEYOND PESTICIDES/NATIONAL COALITION AGAINST THE MISUSE OF PESTICIDES (NCAMP), Kagan Owens, Program Director, 701 E Street, S.E., Suite 200, Washington DC 20003, (202) 543-5450, Fax (202) 543-4791, E-mail: kowens@beyondpesticides.org

Resources for parents, activists, school administrators on the hazards of school pesticide use and their alternatives; model school policies and laws; resources on IPM, pesticide bans and right-to-know programs on local, state and federal level; information on pesticide poisoning incidents and how to document; membership; quarterly newsletter: Pesticides and You; monthly publication: Technical Report; annual national pesticide conference; Web site: http://www.beyondpesticides.org

CENTER FOR HEALTH, ENVIRONMENT AND JUSTICE, Deb Benyik, Children's Health Coordinator, P.O. Box 6806 Falls Church, VA 22040, (703) 237-2249, E-mail: dbenyik@chej.org

Site-specific technical assistance to communities with environmental problems; publications: Gold Standard, school IPM guidelines, an effort of the Poisoned Schools: Childproofing Our Communities campaign, comprised of local, state and national children's environmental health activist groups; newsletter: Everyone's Backyard; membership; Web site: www.childproofing.org

HEALTHY SCHOOLS NETWORK INC., Claire Barnett, Executive Director, 773 Madison Avenue, Albany NY 12208, (518) 462-0632, E-mail: Healthyschools@aol.com

Kick the Pesticide Habit, 8 pp. guide for parents and others in the school community linking child environmental health research and school facility information to practical steps schools can take to pest-proof facilities and reduce pesticide use; advocacy for improved school facility conditions and practices; assistance for parents of allergic, asthmatic, and chemically sensitive students; peer and technically reviewed guides, fact sheets, packets on a variety of indoor environmental problems in institutions serving children on cleaning products, access to public information, renovation vs health, health & safety committees, molds, carpeting, and more; Web site: http://www.hsnet.org

IPM INSTITUTE OF NORTH AMERICA, INC., Dr. Thomas Green, President, 1914 Rowley Ave., Madison WI 53705, (608) 232-1528, Fax (608) 232-1530, E-mail: ipminstitute@cs.com

IPM certification; membership; newsletter; IPM Standards for Schools, 124 pp. school IPM checklist with more than 700 IPM practices and 250 resources for schools implementing IPM including model documents, how-to resources for planning, communication, pesticide risk management, non-chemical controls for school buildings and grounds; IPM verifier training; Web site: http://www.ipminstitute.org including IPM Standards in html and PDF formats and brand name list of least-impact pest control options.

ALABAMA

Government/University/Extension

IPM ALABAMA PROGRAM, Mark A. Rumph, Coordinator, Alabama IPM in Schools Project, 207 Extension Hall, Auburn University AL 36849, (334) 844-6390, E-mail: mrumph@aces.edu

Applicator training (through the Alabama Pest Control Association); advising to schools, PCOs, any other interested groups; model IPM program; newsletters tailored for schools; Web site: http://www.aces.edu/schoolipm

CALIFORNIA

Government/University/Extension

SCHOOL IPM PROGRAM, Department of Pesticide Regulation, California Environmental Protection Agency, 830 K Street, Sacramento CA 95814-3510, (916) 324-4100, Fax (916) 324-4088, E-mail: schools@empm.cdpr.ca.gov

IPM Guidebook and web-based resources on IPM and pesticides for schools, parents, teachers; training-the-trainers in school districts; assessing IPM adoption assessment; model school sites development; California legislation requires annual parental notification, parental advisory of individual pesticide applications upon request and posting of pesticides applications with record keeping; Web site: http://www.cdpr.ca.gov

Non-governmental, non-profit organization

BIO-INTEGRAL RESOURCE CENTER, William Quarles, Executive Director, PO Box 7414, Berkeley CA 94707; (510) 524-2567; Fax (510) 524-1758, E-mail: birc@igc.org

Membership; training programs; newsletters; IPM Practitioner, Common Sense Pest Control Quarterly and more than 100 publications on IPM and reduced-risk pest control; IPM school manual; IPM curriculum; 52-page reduced-risk product list.

COMMUNITY IPM COUNCIL, Phil Boise, IPM/Agronomy Programs Manager, 930 Miramonte Dr., Santa Barbara CA 93109, (805) 963-0583 x150, Fax (805) 962-9080, E-mail: Pboise@rain.org

IPM training; conference and program development for schools, municipalities, professional landscape and communities. Web site: http://www.grc.org

CONNECTICUT

Government/University/Extension

UNIVERSITY OF CONNECTICUT, Dr. Richard A. Ashley, IPM Coordinator, Department of Plant Science, 1376 Storrs Road, U-67, Storrs CT 06269-4067, (860) 486-3438, Fax (860) 486-4562, E-mail: rashley@uconn.edu.

Resources for commercial growers, home gardeners, and school administrators; IPM information for turf, invasive species, weeds; online IPM homestudy courses and publications ordering; Web site: http://www.canr.uconn.edu/ipm

FLORIDA

Government/University/Extension

UNIVERSITY OF FLORIDA, Dr. Philip Koehler, Urban Pest Specialist, Entomology and Nematology Department, Bldg 970, Natural Area Drive, Gainesville FL 32611-0640, (352) 392-2484, Fax (352) 846-1500, E-mail: pgk@gnv.ifas.ufl.edu

Applicator training; advice to schools districts and pest management professionals; sample/model IPM documents (e.g., contracts, policies); E-mail list server; Web site: http:www.ifas.ufl.edu/~schoolipm/ including pest management techniques, downloadable presentations, how-to start an IPM program and sample documents.

IOWA

Government/University/Extension

IOWA STATE UNIVERSITY, Pest Management & the Environment, Dr. Mark H. Shour, 109 Insectary, Ames IA 50011, (515) 294-5963, Fax (515) 294-8027, E-mail: mshour@iastate.edu

Applicator training; advice to schools districts and pest management professionals.

ILLINOIS

Government/University/Extension

SCHOOL IPM TECHNICAL RESOURCE AND INFORMATION CENTER, Entomology Department, Purdue University, Mr. Al Fournier, School IPM Coordinator, 1158 Smith Hall, West Lafayette IN 47907-1158, (765) 496-7520, Fax (765) 494-0535, E-mail: al_fournier@entm.purdue.edu

Advice to schools, pest management professionals in Indiana and Illinois via hotline (1-877-668-8IPM); workshops for school administrators, staff, pest control professionals; pilot programs operating in 3 model school districts and 4 childcare facilities.

Non-governmental, non-profit organization

SAFER PEST CONTROL PROJECT (SPCP), Jessica Bullen, Program Associate, 25 E. Washington, Suite 1515, Chicago IL 60602, (312) 641-5575, Fax (312) 641-5454, E-mail: jbullen@bpichicago.org

Resources for parents, teachers, and schools on IPM; sample IPM materials including sample notification and model policy; newsletter; IPM Handbook and comic book about IPM (English and Spanish); workshops on residential, garden, and school IPM; Web site: www.spcpweb.org

INDIANA

Government/University/Extension

SCHOOL IPM TECHNICAL RESOURCE AND INFORMATION CENTER, Entomology Department, Purdue University, Mr. Al Fournier, School IPM Coordinator, 1158 Smith Hall, West Lafayette IN 47907-1158, (765) 496-7520, Fax (765) 494-0535, E-mail: al_fournier@entm.purdue.edu

Advice to schools, pest management professionals in Indiana and Illinois via hotline (1-877-668-8IPM); workshops for school administrators, staff, pest control professionals; pilot programs operating in 3 model school districts and 4 childcare facilities.

MAINE

Government/University/Extension

MAINE DEPT OF AGRICULTURE, FOOD AND RURAL RESOURCES, Dr. Kathleen Murray, IPM Entomologist, 28 State House Station, Augusta ME 04333, (207) 287-7616, Fax (207) 624-5065, E-mail: Kathy.Murray@state.me.us

Advising to parents, schools, pest management professionals; model IPM policy; publications: What's Bugging Our Schools? Pest Concerns and Pesticide Use in Maine Public Schools: Report of the School Integrated Pest Management Survey, Maine School IPM Outdoor Turf and Pest Management Guide; workshops: On-Site Training Program, a 3-hr presentation to school staff and administrators on IPM objectives and how to develop and implement an IPM program in schools.

MAINE BOARD OF PESTICIDES CONTROL, Gary Fish, 28 State House Station, Augusta ME 04333, (207) 287-2731, Fax (207) 287-7548, E-mail: gary.fish@state.me.us

Applicator licensing and certification; consulting/advising to parents, schools, pest management professionals; newsletter; publications (pamphlets, fact sheets); workshops and conferences (Turf IPM, Structural IPM, Ornamental IPM and other one-day seminars offered annually); Web site: www.state.me.us/agriculture/pesticides

UNIVERSITY OF MAINE COOPERATIVE EXTENSION PEST MANAGEMENT OFFICE, Dr. Jim Dill, IPM Coordinator, 491 College Avenue, Orono, ME 04469, (207) 581-3880, Fax (207) 581-3881, E-mail: jdill@umext.maine.edu

Applicator training; applicator certification; consulting/advising to parents, schools, pest management professionals; publications (pesticide applicator training manuals, insect and disease fact sheets); workshops/conferences (various pest management workshops offered); insect and plant disease diagnostic service; Web site: www.umext.maine.edu/topics/pest.htm

MARYLAND

Government/University/Extension

MARYLAND DEPARTMENT OF AGRICULTURE, Pesticide Regulation Section, Mary Ellen Setting, Chief or Ed Crow, Program Coordinator, 50 Harry S. Truman Parkway, Annapolis MD, 21401, (410) 841-5710, Fax (410) 841-2765, E-mail: settingm@mda.state.md.us and crowea@mda.state.md.us

Regulatory and reference materials: regulations, regulation summaries, sample notices, sample IPM plan, IPM Guidelines, Contracting Guidelines, IPM training manual, supplemental manual on IPM principles and practices, Yellowjackets and IPM, establishing action thresholds, IPM information sheets; Website: www.mda.state.md.us

MASSACHUSETTS

Government/University/Extension

UMASS EXTENSION, School IPM Program, Reginald Coler, Coordinator, Department of Entomology, Fernald Hall, University of Massachusetts, Box 32410, Amherst, MA 01003-2410. (413) 577-3976, FAX (413) 545-5858, E-mail: rcoler@ent.UMass.edu

Applicator training; advising and workshops for schools, pest management professionals.

MINNESOTA

Government/University/Extension

MINNESOTA DEPARTMENT OF AGRICULTURE, Jean Ciborowski, Integrated Pest Management Program Coordinator, Agricultural Development Division, 90 West Plato Boulevard, St. Paul MN 55107-2094, (651) 297-3217, Fax (651) 297-7678, E-mail: jeanne.ciborowski@state.mn.us. Applicator certification contact person: John Wagner, Agronomy and Plant Protection Division, (651) 297-7122, E-mail: john.wagner@state.mn.us

Publications: IPM Overview, Ant Management in Schools, Cockroach Management in Schools, Small Fly Management in Schools, Wasp and Bee Management Around Schools, Rat and Mouse Management in Schools, Weed Management on School Grounds and Athletic Fields, Join Our Pest Patrol - A Backyard Activity Book For Kids - An Adventure in IPM; Web site: http://www.mda.state.mn.us/IPM/default.htm

UNIVERSITY OF MINNESOTA EXTENSION SERVICE, Dean Herzfeld, Minnesota Health, Environmental, and Pesticide Safety and Pesticide Applicator Training Coordinator, 495 Borlaug Hall, 1991 Upper Buford Circle, St. Paul MN 55108, (612) 624-3477, Fax (612) 625-9728, E-mail: deanh@umn.edu

Applicator training manuals plus a wide range of pest management publications and training; Web sites: Health, Environmental, and Pesticide Safety at http://www.extension.umn.edu/pesticides, Community and School IPM at http://www.extension.umn.edu/pesticides/IPM/ipmhome.htm, Pesticide Applicator Training at http://www.extension.umn.edu/pesticides/pat/mnpat.html

Minnesota's Parents' Right-to-Know Act dealing with pesticide application at schools Web site: http://www.revisor.leg.state.mn.us/slaws/2000/c489.html#a7

MINNESOTA DEPARTMENT OF HEALTH, model school pesticide application notices, school compliance and related information Web site: http://www.health.state.mn.us/divs/eh/esa/hra/notification.html

MINNESOTA DEPARTMENT OF CHILDREN FAMILIES AND LEARNING maintains a searchable database listing pesticides and their EPA toxicity category at http://cfls.state.mn.us/pesticide

MONTANA

Government/University/Extension

MONTANA STATE UNIVERSITY, Will Lanier, IPM Assistant, 422 Leon Johnson Hall, Bozeman, Montana, 59717, (406) 994-5690, Fax (406) 994-6029, E-mail: wlanier@montana.edu

Applicator training; advice to schools, pest management professionals; sample/model IPM documents; e-mail list server; Web site http://IPM.montana.edu including pest management techniques from national authorities, downloadable presentations, how-to start an IPM program and sample documents, lesson plans for middle school science teachers to incorporate school IPM into science classes.

NEW JERSEY

Government/University/Extension

RUTGERS COOPERATIVE EXTENSION Pest Management Office, Dr. George Hamilton, 93 Lipman Drive, Rutgers University, New Brunswick NJ 08901, (732) 932-9801, Fax (732) 932-729, E-mail: hamilton@aesop.rutgers.edu

Applicator training; advising to schools and pest management professionals; IPM certification criteria, sample/model IPM documents (e.g., contracts, policies).

Non-governmental, non-profit organization

NEW JERSEY ENVIRONMENTAL FEDERATION, Jane Nogaki, IPM Program Coordinator, 223 Park Avenue, Marlton NJ 08053, (856) 767-1110, Fax (856)768-6662, E-mail: janogaki@eticomm.net

IPM advising to parents, teachers, schools; model notification and IPM policies; IPM training workshops for lawn care, schools, urban settings; listing of NJ schools using IPM; materials on lawn care, indoor pest control, mosquito control; Web site: www.cleanwateraction.org/njef

NEW YORK

Government/University/Extension

CORNELL COMMUNITY IPM PROGRAM, Lynn Braband, Extension Associate, New York State Agricultural Experiment Station, Geneva NY 14456-0462, (800) 635-8356, (315) 787-2408, Fax (315) 787-2360, E-mail: lab45@cornell.edu; LONG ISLAND: Dr. Jody L. Gangloff, IPM Area Specialist, Cornell Cooperative Extension, 1425 Old Country Road, Bldg. J, Plainview NY 11803, (516) 454-0900 ext. 270, Fax (516) 454-0365, E-mail: jlg23@cornell.edu

Applicator training; advising to schools and pest management professionals; funding for school IPM projects; newsletter; publication: IPM Workbook for New York State Schools; workshops; demonstration and applied research projects; Web site: http://www.nysaes.cornell.edu/ipmnet/ny/urban/ includes IPM Workbook for New York State Schools and several other publications.

OHIO

Government/University/Extension

OHIO STATE UNIVERSITY IPM PROGRAM, Margaret F. Huelsman, Extension Associate, 1991 Kenny Road, Columbus OH 43210, (614) 688-8431, Fax (614) 292-9783, E-mail: huelsman.16@osu.edu

Applicator training; advising to parents, schools, pest management professionals; sample/model IPM documents; workshops: How to get a school IPM program started in your school district (Spring 2001); Web site: http://www.ag.ohio-state.edu/~ipm

Non-governmental, non-profit organizations

RURAL ACTION SAFE PEST CONTROL PROGRAM, Heather Cantino, Coordinator, 33 Cable Lane, Athens OH 45701, (740) 594-3338, Fax (740) 593-3228, E-mail: aa734@seorf.ohiou.edu

Services to Midwest/Appalachia/Ohio; advising to schools, pest management professionals, IPM advocates; sample IPM documents including teacher education materials, IPM principles and implementation guidelines, pest prevention checklists, home safe pest control strategies; workshops/presentations for school officials, teachers, and parents on IPM rationale, methods, techniques, implementation goals and process; Web site http://www.ruralaction.org/ipm.html, including downloadable sample documents.

PENNSYLVANIA

Government/University/Extension

PENNSYLVANIA DEPARTMENT OF AGRICULTURE, Lee B. Bentz, IPM Coordinator, 2301 N. Cameron St., Harrisburg PA 17110-9408, (717) 772-5204, Fax (717) 783-3275, E-mail: lbentz@state.pa.us; Dr. Ed Rajotte, IPM Coordinator, The Pennsylvania State University, 501 ASI, University Park PA 16802, (814) 863-4641, Fax (814) 865-3048, E-mail: egrajotte@psu.edu

Advice to school districts and pest management professionals; sample IPM documents (e.g., contracts, policies); publications: Common Household Insects, Pyramid of IPM Tactics for Schools; video: Insects and Spiders and Mites Oh My!, quarterly newsletter; workshops for teachers; Web site: http://paipm.cas.psu.edu/

TENNESSEE

Government/University/Extension

UNIVERSITY OF TENNESSEE AGRICULTURAL EXTENSION SERVICE, Karen M. Vail, Urban Entomologist, Entomology and Plant Pathology Department, 218 Plant Science Building, 2431 Center Drive, Knoxville TN 37996, (865) 974-7138, Fax (865) 974-8868, E-mail: kvail@utk.edu

Advising to parents, schools, and pest management professionals; sample IPM documents (e.g., contracts, policies); publications: Suggested Guidelines for Managing Pests in Tennessee's Schools: Adopting Integrated Pest Management (PB1603), Integrated Pest Management of Landscapes (PB 1639); workshops/conferences for school officials, pest management professionals and school plant managers; Web site: http://www.utextension.utk.edu/pbfiles/pb1603.pdf

TEXAS

Government/University/Extension

TEXAS AGRICULTURAL EXTENSION SERVICE, Dr. Michael Merchant, Associate Professor and Extension Urban Entomologist, Texas A&M University Center, 17360 Coit Road, Dallas TX 75252-6599, (972) 231-5362, Fax (972) 952-9632, E-mail: m-merchant@tamu.edu

IPM Coordinator training; applicator training; CEU training; advice to schools districts and pest management professionals; sample/model IPM documents (e.g., contracts, policies); publications: Pest Control in Texas Schools. Adopting Integrated Pest Management. B-6015; ABCs of IPM video training modules for school districts, includes an introductory video on IPM for schools; IPM Posters.

WASHINGTON

Government/University/Extension

WASHINGTON STATE UNIVERSITY PUYALLUP, Carrie R. Foss, Pesticide Education and Dr. Art Antonelli, Extension Entomologist, 7612 Pioneer Way, E. Puyallup WA 98371-4998, (253) 445-4577 and (253) 445-4545, Fax (253) 445-4569, E-mails: cfoss@wsu.edu and antonell@wsu.edu

WASHINGTON STATE DEPARTMENT OF AGRICULTURE, Dr. Dan Suomi, Agricultural Chemical Specialist, P.O. Box 42589, Olympia WA 98504, (360) 902-2044, E-mail: dsuomi@agr.wa.gov

Non-governmental, non-profit organization

WASHINGTON TOXICS COALITION, Cheryl Holzmeyer, Healthy Schools Campaign Coordinator, 4649 Sunnyside Ave. N, Suite 540-East, Seattle WA 98103, (206) 632-1545 x11, Fax (206) 632-8661, E-mail: cholzmeyer@watoxics.org

Advising to parents, school districts, and others seeking to reduce pesticide use in schools; membership; sample/model IPM documents (e.g., contracts, policies); newsletter: Alternatives; reports and fact sheets including Toxic by Design: Why We Need to Reduce Pesticide Use NOW, Healthy Homes for Healthy Kids, Weed Wars: Pesticide Use in Washington Schools, and others including a series designed for professional landscapers; Toxics Hotline (800) 844-SAFE; Web site: http://www.watoxics.org including Seven Steps to Reducing Pesticide Use in Schools, and a model least-toxic IPM policy.

WEST VIRGINIA

Government/University/Extension

WEST VIRGINIA DEPARTMENT OF AGRICULTURE, Pesticide Regulatory Programs, Dr. Peggy K. Powell, Certification/Compliance Assistance Supervisor, 1900 Kanawha Blvd East, Charleston WV 25305-0190, (304) 558-2209, Fax (304) 555-2228, E-mail: ppowell@ag.state.wv.us

Applicator training and certification; advising to parents, schools and pest management professionals; West Virginia Title 61, Series 12J Rules for IPM Programs in Schools and Day Care Centers; bulletins and fact sheets.

WISCONSIN

Government/University/Extension

WISCONSIN DEPARTMENT OF AGRICULTURE, TRADE, AND CONSUMER PROTECTION, Brian Becker, School IPM Specialist, PO Box 8911, Madison WI 53708-8911, (608) 224-4547, Fax (608) 224-4656, E-mail: brian.becker@datcp.state.wi.us

Applicator certification; advising and workshops for schools; School Integrated Pest Management Manual for Wisconsin's Schools; Web site: http://ipcm.wisc.edu/programs/school/table.htm including School IPM Manual.

UNIVERSITY OF WISCONSIN, Department of Horticulture, Dr. John Stier, Asst. Professor, 1575 Linden Drive, Madison WI 53706, (608) 262-1624, Fax (608) 262-4743, E-mail: jstier@facstaff.wisc.edu; Department of Entomology, Karen Delahaut, IPM Outreach Specialist, 1630 Linden Drive, Madison WI 53706, (608) 262-6429, Fax: (608) 262-3322, E-mail: kadelaha@facstaff.wisc.edu; Dr. Chris Williamson, Turfgrass Entomologist, 1630 Linden Drive, Madison WI 53706, (608) 262-4608, Fax (608) 262-3322, E-mail: rewillie@entomology.wisc.edu; Phil Pellitteri, Insect Diagnostician and Indoor Pest Specialist, 1630 Linden Drive, Madison WI 53706, (608) 262-6510, Fax (608) 262-3322, E-mail: pellitte@entomology.wisc.edu

Applicator training (Turf and Landscape category 3.0 and Structural Pest Control category 7.1); advising and workshops for schools and pest management professionals; Web site http://ipcm.wisc.edu/programs/school/; including Wisconsin's School Integrated Pest Manual with sample IPM documents.

School Pest Management in the News

These headlines were culled from a search of articles in U.S. publications containing the words "school" plus "pest," "pesticide," or "integrated pest management" between 07/01/2000 to 11/20/2000. To read the complete articles, most newspaper Web sites permit searching for recent articles free of charge, and archive searches for a fee.

"Pesticide Exposure at Schools," Los Angeles Times, 11/19

"Venture County Perspective: Who Will Protect the Children at School?" Los Angeles Times, 11/19

"Ventura County News: State Tests Find Pesticide on Campus," Los Angeles Times, 11/15

"Hotter Earth May Boost W. Nile Virus," New York Daily News, 11/14

"Schools and Farms: A Risky Mix, " Los Angeles Times, 11/12

"State Investigating Use of Pesticide," Los Angeles Times, 11/11

"Parents Call for Ban on Pesticide Use Near Schools," Los Angeles Times, 11/10

"Ventura County News: Pesticide Fumes Send 2 Home at Mound School," Los Angeles Times, 11/09

"Pest Control: Attending School May Be Hazardous to Your Health," The Commercial Appeal, Memphis TN, 11/05

"Parents Can Learn About Pesticides in Schools," The Commercial Appeal, Memphis TN, 11/05

"Fleas Shut Down Elementary School," AP Newswires, New Orleans, 11/04

"Measure Limiting Pesticides Near Schools Takes Effect," AP Newswires, Boston, 11/01

"New pest control law in effect," Telegram & Gazette, Worcester MA, 11/01

"N.O. Students, Teachers Flee Fleas at School," The Times-Picayune, 11/01

"Fine, Suspension Issued for Pesticide Offense," The Seattle Times, 10/18

"Tangled Up in Green: Weeds Run Amok On School Playgrounds," Wall Street Journal, 10/05

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Published by The IPM Institute of North America, Inc., 1914 Rowley Ave., Madison WI 53705
(608) 232-1528, FAX (608) 232-1530, E-mail ipminstitute@cs.com, Web site: www.ipminstitute.org

The IPM Continuum

IPM is a collection of practices, all designed to maximize effectiveness and minimize risks associated with pests and pesticides:

- **Monitoring and thresholds**. Actions are taken against pests only when truly necessary, not on a routine basis or regular schedule. Pests are dealt with as problems arise with a focus on monitoring and chemical control. Pest and pesticide risks are reduced by improving timing and pest-specificity of control actions and eliminating routine pesticide applications. Entry Level IPM practices include inspection and monitoring to identify pest levels and conditions favoring pests; accurate identification and diagnosis of problems; and using the minimum effective amount of least-risk pesticides only when pests exceed predetermined levels.

- **Choosing effective, reduced-risk options**. Efforts to reduce pesticide risks include replacement of high-risk pesticides with lesser risk alternatives. Broad-spectrum pesticides, toxic to many different pests, are replaced with selective controls tailored to the pest problem at hand, including non-chemical options. Pesticides, when necessary, are applied at the lowest effective rate and to as limited an area as possible. Responses to insect, disease, weed and other pest problems are coordinated to minimize unfavorable interactions.

- **Establishing long-term, preventive and avoidance strategies.** Implementing solutions to prevent pest problems reduces the need for chemical or non-chemical intervention. Pest management is integrated with structural design and maintenance, sanitation, horticultural practices, personnel training and other key factors to maximize overall performance and minimize risks and environmental impacts. High Level IPM practices include modifying structures to avoid pest problems, new or renovated structure design minimizes pest problems and staff and students are educated to actively participate and share responsibility in preventing and avoiding pest problems.

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IPM Standards for Schools V2.0

Published by

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